COAL AGE

Vol. 12 NEW YORK, DECEMBER 1, 1917 No. 22

The Chief Aid to Safe Mining

IF 100 mine inspectors were asked, "What is the principal factor contributing to safety?" I believe 99 would immediately answer, "Discipline." Wherever there is an absence of discipline, the efforts of an otherwise good foreman are dangerous; with it, an indifferent mine official may obtain a good record.

Discipline is preeminently the least costly of all safety measures. It is about the only intangible thing about a mine that bears tangible results. It may cause a little friction here and there, but it makes system and safety possible in a large sphere of activity, and eventually puts money in the pockets of the owner and credit marks on the foreman's record of mine management. It reduces insurance costs for the employer.

Every order issued and insisted on (assuming all such are reasonable and fair to employer and employee alike) lessens future effort to again obtain the same result; each ruling allowed to go by default means future disorganization. It also means death for some, injury for others, and a consequent tightening of compensation rates.

ONE or two actual illustrations of laxity of discipline and its almost certain result will probably carry greater conviction than reams of sermonizing. Let me tell you of a mine where some time ago I saw men leaving the pit by way of the hoisting slope. I drew the foreman's attention to this dangerous practice and told him what must have been obvious to himself, that it was not only unsafe but unlawful. The mine foreman replied that he had warned his men of the violation, but that it was hard to control them. The company needed miners badly, and he feared to insist on his orders being obeyed.

I suggested to the foreman that he place a danger board at the top and bottom of the hoisting slope and make an example of the first man to go out that way. My suggestion wasn't carried out. Some time later I was sent back to that same mine. Two men had been killed while doing the very thing the foreman had told them not to do. I have often wondered how that same boss feels when he contemplates those fatherless children and those two graves which his insistence on obedience would have prevented.

THE foregoing is a major example. One sees many minor phases of laxity which are primed for later trouble. Some of these are almost humorous, were it not for the little paragraphs occasionally seen telling of this or that miner who was "crushed to death by a fall of slate."

Many accidents result from an utter indifference to danger on the part of the miner himself, and in such instances we can be pardoned for not being filled with pity. However, even such cases only prove that to obtain the fullest measure of safety, every mine official must be not only inflexible but persistent, insistent and alert. He should be constantly on the watch and should form a habit of showing up in different places at unexpected times.

IN carrying out the plan of making surprise visits, I stopped near the face in a miner's room near quitting time one day. The fellow was loading his last car from under a dangerous piece of slate and was so busy he failed to observe my presence. I noticed a back post missing from beneath the slate, and also observed that this particular spot had been designated as the proper location for a prop by either the foreman or the fireboss.

"Don't you think you had better put a back post under that slate, Johnny?" I said.

A big, round black face shot up over the car end; black in both natural and artificial colors.

"I dun hab one dere, boss," he replied, "but I dun tuk it out to load dis yere cyar what de driber is shure nuff commin' fer terday."

The thought flashed through my mind, what a surprised colored gentleman there would be if the mine official who ordered the post put up were to make a sudden visit to this working place. This incident only strengthened my conviction that most mine officials do not follow up orders as generally as they should. Discipline is not discipline if rules are not obeyed.

Written by James T. Reynolds, Mine Inspector

Ideas and Suggestions

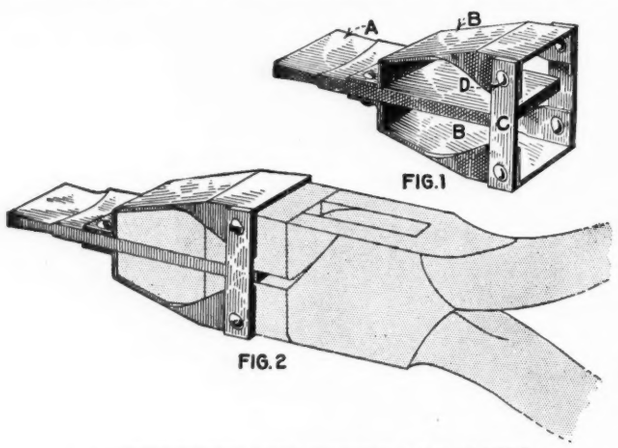
One Method of Handling Coal in Slightly Pitching Beds

In many places in the anthracite region the seam is too steep to permit the use of buggy roads and not steep enough to enable the coal to slide on sheet iron. So that these places can be worked the miners make boxes from 3 to 6 ft. long and 2 ft. wide, having no bottom, and from 18 in. to 2 ft. high, the size depending on the weight (empty) the miner can pull up the chamber. These boxes are usually made of 1-in. boards, and as light as possible. The coal is shoveled into the boxes, and when full they will slide down the room on sheet iron at a much smaller angle than would the coal. When the box is emptied, the miner pulls it back to the face of the chamber for reloading.

Screwdriver Attachment for Use on Cutting Pliers

Since pliers and screwdrivers are the tools most frequently used by the electrician, they should be in such a form that they can be easily carried around. Pliers are often made and sold with a screwdriver forged on the end of one of the handles, but as the screwdriver is unhandy it is seldom used.

After much experimenting, the screwdriver attachment like that shown in the illustrations was developed and



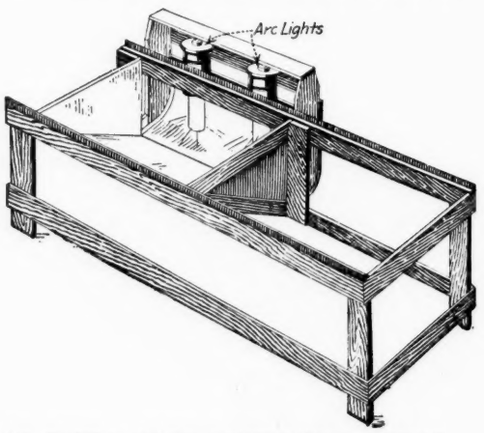
SCREWDRIVER ATTACHMENT FOR PLIERS

proved useful, writes M. P. Bertrande in *Power*. In Fig. 1, *A* is made of tool-steel and hardened. The jaws *B* are bent from $\frac{1}{16}$-in. soft sheet iron and held together by the two straps *C* and rivets *D*. Dimensions cannot be given, as curves and shapes change in accordance with the shape of the pliers used. The form is obtained by bending the sheet iron around the pliers and riveting it to the tool-steel blade *A*. The device is so small that it can be easily carried in the vest pocket. Fig. 2 shows the screwdriver attachment in place ready for use.

Blueprint Machine

Where blueprints are needed frequently, but there is not sufficient work to pay for an automatic printing machine, the one described by G. F. Wetzel, in *American Machinist*, of Nov. 15, 1917, will answer the purpose. Any carpenter can put it together, and the material needed is inexpensive and easy to obtain.

The machine frame is made of $\frac{7}{8}$ x 4-in. boards and is about 6 ft. 6 in. long, 27 in. wide and 36 in. high. On the upper edge of both front and back top strips is screwed a 1 x 1 x $\frac{1}{8}$-in. angle, with vertical flange outward. This serves as a track for the printing frame,



AN EASILY MADE BLUEPRINT MACHINE

which has a small grooved pulley and shaft fastened on each side near the corner. A standard 24 x 36-in. printing frame is used.

One end of the machine frame contains the light-well, which is 3 ft. long and bounded on each end by a triangular sheet of aluminum, polished on one side, of about No. 16 gage, B. & S. A plate-glass mirror, approximately 30 x 32 in., slants down at 30 deg. from the top front member, and at the back is a sheet of aluminum. The light is furnished by two arc lamps, spaced about 15 in. on centers and in front of the rear reflector sheet. The lamps are supported by wooden braces, as shown in the figure. The rear reflector is bent at the bottom to come around and meet the lower edge of the mirror, where two pins in the frame engage in holes in the sheet. At the upper edge of the sheet two round holes, with radial short slots at the top, slip over two wood screws with round heads. Thus by raising the sheet it can be removed for access to the arc lamps. About an inch space is left around the rear sheet for ventilation.

In using the outfit, the printing frame is in a horizontal position, with the glass side down, on the tracks. The felt pad and back are heavy enough to hold the tracing and paper flat. Ordinarily, the frame is left over the light-well; but for wiping dust off the mirror or inspecting the lamps, it is pushed to one side. As the

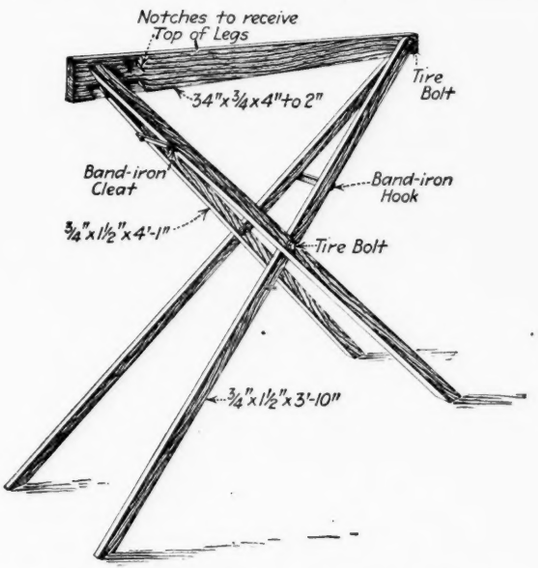
field of illumination is only 30 in. wide, when a longer print is desired expose only one half and then the other one by rolling the frame along. If larger prints than 30 in. are standard, three lamps will be needed.

Good, evenly colored prints can be made in about 5 min., using electric rapid blueprint paper, without moving the frame. In shops where this machine would fit in, ordinarily the draftsman can stop long enough to start the print, go back to his desk and then remove the print without interfering appreciably with his work.

Another way in which the machine can be used is in tracing sketches or prints. By removing the pad and back of the printing frame, the light will show through a heavy print or sketch made on drawing paper, so that the drawing can be readily traced.

Folding Trestle for Drafting Table

A drawing table trestle which will take up a space only 4 in. square and 4 ft. long when stored would prove a great convenience to many engineers who do not need a drawing table continually, or whose work sometimes requires one where ordinarily there would not be proper facilities. According to H. A. Sitterley in *Engineering News-Record*, Sept. 27, 1917, the trestle in the accompanying drawing has been used for the last two



ADJUSTMENT FOR HEIGHT AND SLOPE OF BOARD EASILY MADE

years at the Low Moor Iron Co., of Virginia, and has proven to be convenient, rigid, light and capable of being easily transported and stored in a small space.

The following is a bill of necessary materials:

2—¾ x 1¾-in. hardwood strips, 4 ft. 1 in. long, front legs.
2—¾ x 1¾-in. hardwood strips, 3 ft. 10 in. long, back legs.
1—¾ x 4-in. hardwood board, 34 in. long, top piece.
6—1-in. shothead screws.
2—2-in. tire-bolts and washers.
1—2½-in. tire-bolt and washer.
1—¾-in. band-iron strip, 7 in. long, drilled for screws on 6-in. centers and one hole cut out to serve as a hook.
1—¾-in. band-iron strip, 4 in. long, drilled for screws on 3½-in. centers.

The method of assembling is perhaps sufficiently illustrated in the drawing. By placing the top ends of the longer legs in the different notches, in the top piece, the top of the trestle can be made either level or sloping, and the height adjusted from 34 to 42 inches.

String Line Stakes To Prevent Mix-up

The numbered line stakes carried by the South African axman shown in the photograph, says G. T. Ritchie, in *Engineering News-Record*, are strung on thin wire. Not only are they convenient to carry in

AXMAN WITH LINE STAKES STRUNG IN ORDER ON WIRE

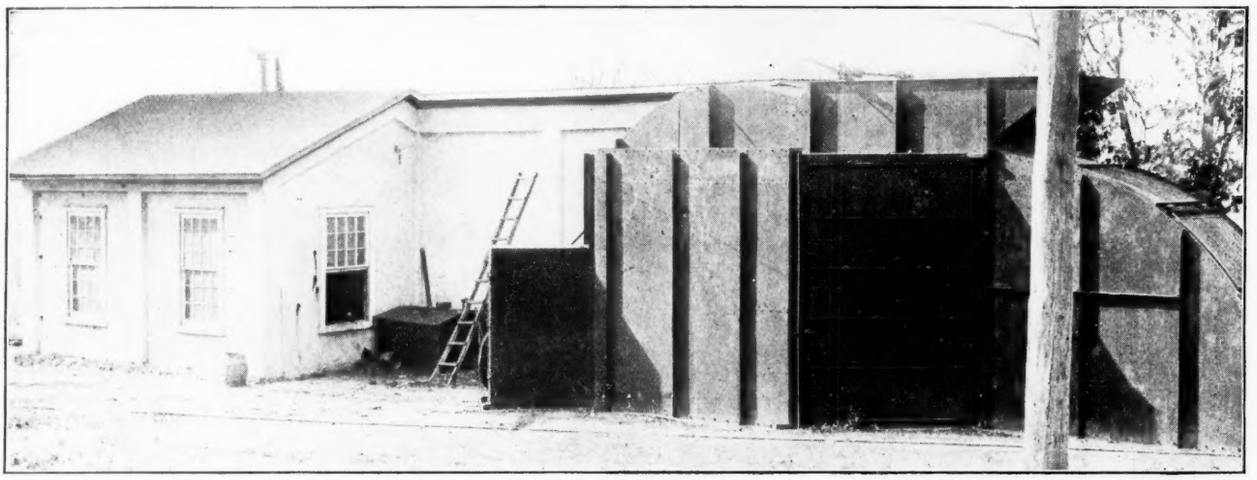
this way, but by threading them consecutively on he wires with the numbers in the inverse order in which they are to be driven, the selection of the correctly numbered stake is rendered foolproof.

Lining of Mine Track

One of the large coal companies in the anthracite region has adopted a novel method for the lining of mine track. The engineering corps, when it places centers for the driving of headings, carries with it a pail of white lead and a paint brush, and paints on the roof of the heading a straight line connecting each of the centers that have been established. If there is to be a curve in the heading, the point at which the curve starts and ends is indicated on the line.

When the tracklayers are ready to lay track, all that is necessary for them to do to find where the track goes is to drop a plumb line from the roof, which establishes the center of the track.

The extra work occasioned the engineering corps by the adoption of the scheme just outlined will be amply repaid by the good track that will result. The alignment is excellent and the curves are just right—they start at the correct point, have the proper curvature and end at the right point.



Old and New in Safety Methods

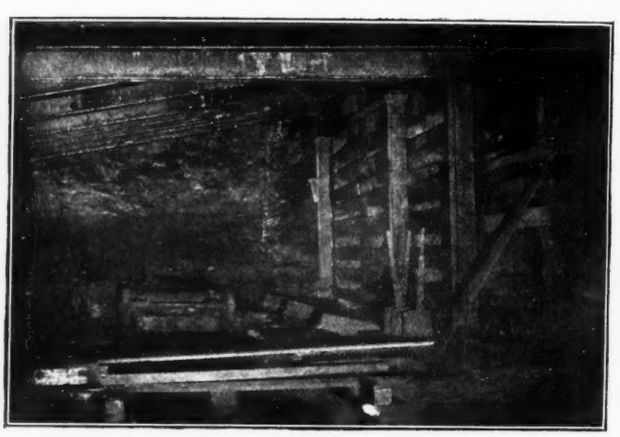
By F. S. RIORDAN
Adjuster, Lehigh Coal and Navigation Co., Lansford, Penn.

THE greatest economic movement developed in the last 20 years is that of "Safety First." Advocates of workmen's compensation laws would no doubt consider it secondary; and while the two go hand in hand, the former is more far-reaching in its effects and from a purely economic standpoint more beneficial to the employer and the employee.

While the compensation laws have added impetus to the "Safety-First" movement in the last few years, in many industries there were relief systems corresponding in many ways to the present compensation idea, while the safety end was entirely neglected. This fact was nowhere more apparent than in the anthracite mining industry. While this great industry was slow to develop the "Safety-First" idea, it is also true that no industry has made greater headway, developed greater efficiency or a finer system of educating the men both practically and theoretically in this great work.

A brief insight on prevailing conditions a comparatively few years ago will enable us to grasp with greater force the vast strides made in bettering conditions.

A far greater number of the injuries received in and about the mines are trifling. Of these contusions and lacerations predominate. In the old days when a man or boy received a cut that bled anyway freely, the prevailing remedy to stop the blood was to plaster a quid of tobacco over the wound and tie it with a handkerchief, generally colored and dirty, and ofttimes with a piece of the lining of a working coat, which at any time is out of the question in the capacity of a bandage. If tobacco was not used, the next popular remedy was to use a cobweb gathered from some corner. It would be hard to find a remedy to act as a germ carrier that could improve on either of these, and yet they were once established "cures."



CAR-PUSHING DEVICE AT BOTTOM OF A SHAFT; NOTE STEEL TIMBERS

A handkerchief around the end of a match was the method used in removing foreign bodies from the eye. In case of an injury to the foot or leg, if it was not a fracture, though severe enough to prevent walking, the common conveyance from work to the home was on the back of a mule. Imagine the jolting received over a mile or two of rough roads. Of course, someone always accompanied the injured person, and it was his duty to lead the mule and see that it was returned to the stable.

In case of a severe accident—and there were many—conditions were worse. It was then necessary to telephone for the ambulance, as it was rarely indeed that one was kept around the colliery. One ambulance did the work for a number of operations. It was generally kept at a central point and hauled by a team of mules. It took an hour or more for it to reach the scene of the accident and another hour to get the injured person home. If the case was serious enough to be sent to a hospital, it meant a wait for the train. In most cases the hospital was quite a distance away, for it must be remembered that there were few hospitals in the whole anthracite field. It very often was a matter of hours, sometimes the greater part of a day, before the injured man reached the hospital. Inherently strong constitutions alone prevented many such cases from resulting fatally.

Gas burns were frequent. There was no preliminary treatment, and a coat thrown over the head and hands was the only precaution. The delay in getting the man home made it almost impossible to keep the air from

the burns, and the frost in winter very often aggravated the conditions, a fact which accounts for so many missing ears and scarred faces among the older miners.

Electricity as a means of hauling inside the mines is a comparatively recent innovation. It was done generally by mules or small locomotives. The airways were inadequate, and where the "lokies," as they were called, were used the sulphur fumes were thick along the main gangways. To have someone overcome by sulphur fumes was a frequent occurrence. In addition to this there was the usual number of accidents due to the other poisonous gases. In all these cases only the most primitive means of resuscitation were used. Such things as the pulmotor or lungmotor were unknown. Fuse and the old-fashioned squib were used exclusively for firing shots. This alone was responsible for the great number of accidents caused by premature blasts, etc. Naked lights were the rule, safety lamps being used only in the very gaseous sections. They were the old-fashioned gauze or Davy lamp which could be opened at will, a fact which contributed in no small degree to the increase in the number of gas explosions.

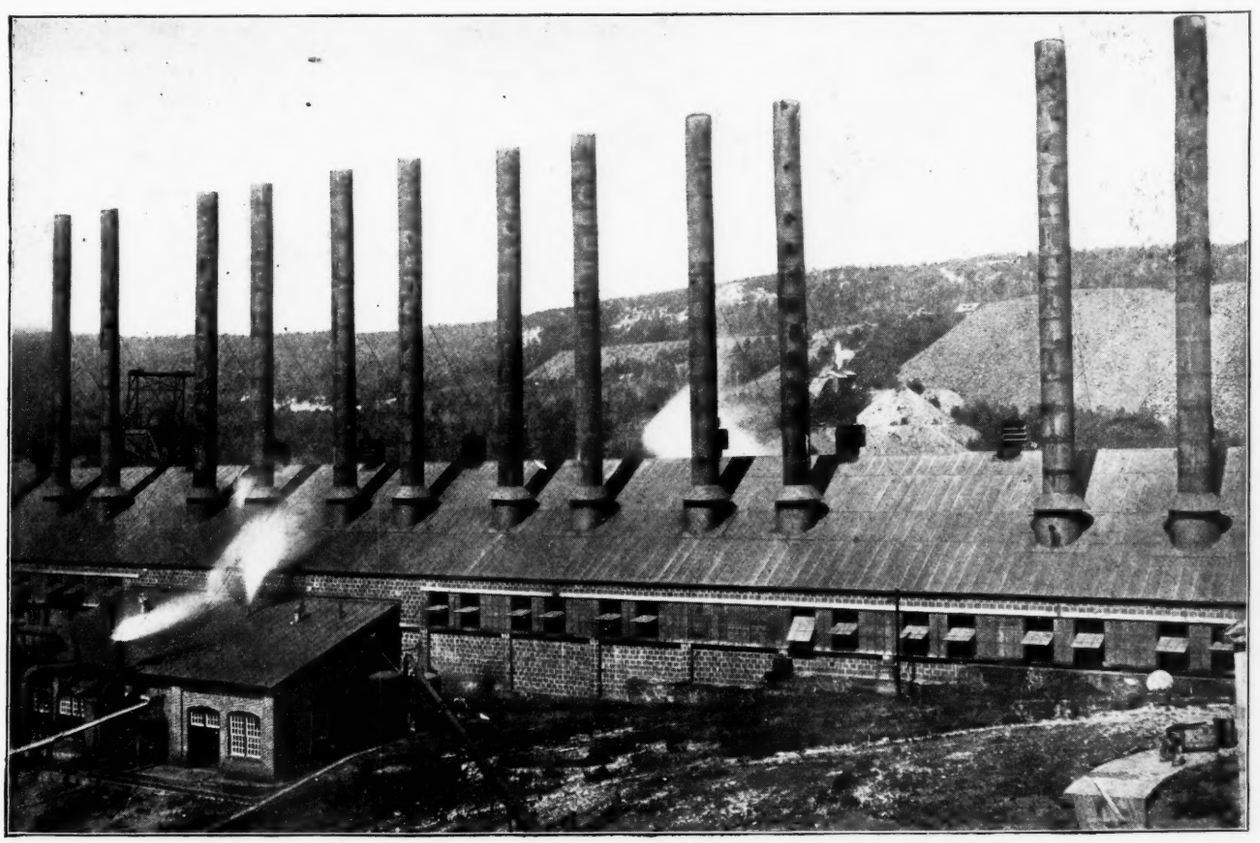
Rockwork was done entirely by hand. The hammer and jumper, a slow and toilsome method, was used. The absence of water, the inability to use it in top holes when at hand, and the abundance of rock dust, so deadly to the miner, accounts for many a little mound in the cemeteries on the hillsides, where sleep those early sacrifices to industrial conditions.

Then, as now, many places were wet. The men who unfortunately worked in them had to go home without changing their clothes. In the winter especially this was a severe hardship. Rheumatism or some like disability was the inevitable result.

FIREPROOF WASHHOUSE

The scorn with which the miner, as a rule, treated trifling cuts on hands or face and his neglect to thoroughly clean them always left an indelible print—the insignia, so to speak—of his occupation. When we look today at the scarred hands and faces of the "old timers," we realize fully the lack of attention paid to trifles. So much for things as they were. A look at existing conditions as they are will enable us to see more convincingly the marvelous changes, brought forth mainly by the "Safety-First" movement.

At the present time there is no company of any importance in the whole anthracite field which does not



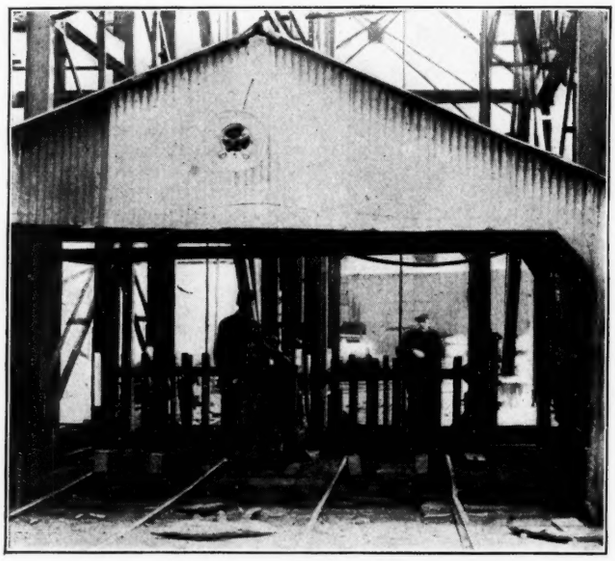
FIREPROOF BOILER ROOM, SHOWING METHODS OF CONSTRUCTION AND VENTILATION

employ one or more surgeons, trained men, skilled in their work, and of the highest professional standing in their respective communities, whose duties are to minister to the various needs of the injured employees as well as instruct the first-aid teams. That is another point. All the larger companies have first-aid teams, both inside and out at all their collieries. These men practice several hours a week under the surgeon in charge as well as attend lectures at night at least once a month. All this is done in company time, and the men are generally paid their regular rate for all time so spent.

Large silver cups have been offered for the teams most proficient in their work. There is a yearly meet, in open competition, under neutral judges, where in addition to the cup, money prizes, medals, etc., are offered. The result of all this is that at all the collieries there are a number of men who know just what to do and how to do it in case of an accident. Emergency hospitals are constructed both inside and outside the mines. Skillful hands are always ready to relieve the pain of the injured.

Many Changes Have Taken Place

In case of burns there are medicated gauze bandages to be applied. The working coat of old is replaced by the best kind of blankets. The old mule-drawn ambulance has disappeared and a motor-driven one has taken its place. Where it took hours before, it is now a matter of minutes until the ambulance is waiting to start its journey. Hospitals have been established within easy access and it is rarely indeed that more than an hour elapses between a serious injury and the placing of the man in the hospital.



SAFETY STOPS AT TOP OF A SHAFT

The use of tobacco quids and cobwebs has entirely discontinued. To employ them now would be considered the greatest breach of safety methods. Foreign bodies in the eye are always removed by a doctor except in rare cases when the men do not come under the notice of someone in charge. The slightest cut is given the utmost attention. It is thoroughly cleaned and dressed. Many times there remains a slight scar, but the blue marks formerly so common are now the exception. Missing ear tops and scarred faces due to gas burns are a rarity. Infections are minimized.

Motors have replaced the mules and "lokies." Sulphur fumes are gone, and the pulmotor and lungmotor are always at hand when needed for the noxious gas poisonings.

Squibs have disappeared entirely and fuse is rapidly going out of existence. In their place are electric batteries, and premature explosions occur only in case of the grossest negligence. Naked lights are used only in the main haulage ways. The old-style safety lamp is now a relic of the past. In their stead are modern locked lamps that can be opened only by a magnet kept for that purpose. Electric battery lamps are also used.

Rockwork today is done by air-driven machines that have a water attachment, thus lessening the amount of dust to such an extent that the dreaded "rockman's tuberculosis" is only found in rare instances. At all the collieries are found large fireproof washhouses. Hot and cold water and shower baths are provided, as well as individual lockers in which the men keep their clothes. Wet places are no longer feared. Today the men have but a few steps to a warm, steam-heated bathroom. A refreshing shower bath and fresh clothes sends them home feeling like a well-conditioned athlete. Similar precautions have been taken in and around the breakers. The belts have been covered. All wheels and other dangerous machinery are closed in by a guard rail. Everything possible is done or being done to lessen the danger.

SAFETY GUARDS ON SHOP MACHINERY

Mine-rescue cars equipped with the latest and most approved Government apparatus and men skilled in the use of the different kinds of apparatus are always at hand if needed. At each colliery there is a committee that meets at least once a month, generally weekly, to discuss ways and means of preventing accidents. When a serious accident occurs they try at once to discover the cause and take immediate steps to prevent a recurrence. In this manner a check is placed on each man by his fellowmen, and the consequent result is a keen rivalry in careful attention to safety conditions.

Among the men of the different sections as well as the foremen in charge has arisen a desire to reduce the amount of lost time due to accidents. Prizes are awarded in some instances to the district making the best showing in that respect.

Men are employed in gaseous mines whose duty it is to search all men as they enter. Matches, pipes, cigarettes, etc., are taken from them, and if any one is detected smuggling smoking materials to his place of work, he is discharged at once.

One of the most noticeable improvements is that of fire protection both inside and outside the mines. Portable electric-driven pumps are provided inside the mines. These can be placed in operation on short notice, making it almost impossible for a fire to get much headway before being checked. Patrolmen are employed to travel the entire mines nightly, examining every place in order to detect fire and prevent it getting beyond control, and outside equal precautions have been put into effect.

All this has not been accomplished in a day. It has been a slow but constant process of education, and the results are worth the time and patience taken. There is a noticeable change in the civic conditions also. The well-kept, neat-appearing colliery buildings tell their own story. The men are carrying these new ideas home. There is an absence of the tin cans and ash piles in the back yards and alleys. Of course, there is an occasional sluggard, but he is the exception. The miner of average intelligence today is fairly well acquainted with the fundamental laws of hygiene.

The interest shown by the employers in their physical comforts has caused the men to become interested in their own mental development. The result is a crowding of night schools, each man studying what will best further his interests. All this tends to make a better satisfied and more intelligent and efficient workman, and the result can be traced directly to the propaganda started toward "Safety First."

New Bulletin on Miners' Lamps

"Approved Electric Lamps for Miners" is the title of Bulletin 131 of the Bureau of Mines, Department of the Interior, just issued. The authors are H. H. Clark and L. C. Ilsley.

This bulletin describes the development of a number of types of lamps that meet mining requirements, and discusses in detail the features and qualities of these lamps, which in November, 1916, were being put into use by mine operators in this country at the rate of about 2000 a week.

Those lamps that meet a certain minimum specification are approved by the Bureau of Mines. No manufacturer is required to obtain this approval, but the manufacturers have voluntarily submitted their lamps for investigation and criticism. None of the lamps submitted to the bureau was found acceptable in its original form, and the coöperation with the Bureau of Mines of the makers of lamps, bulbs and cords has extended over the past three years, and the art of making safe miners' electric lamps has thereby been developed much more rapidly than would have been the case had the development been solely the result of commercial exploitation. Also, it is believed that by this method the mining public has been saved expensive and dangerous experiments, which might have cost many lives and for a time condemned the electric lamps as an impracticable device.

The authors, in discussing the subject, say: "The type of open-flame oil lamp now used in mines is the product of long evolution; its principal merit is simplicity. That such a light is unsafe in an atmosphere containing gas (methane) is evident, and Sir Humphry Davy immeasurably increased safety in coal mines when he found means of protecting a lamp flame so that it would not readily ignite gas. The safety lamp, however, gives less light than the open-flame lamp, is not as simple in construction, is more cumbersome and must be carried in the hand. Consequently, some miners are reluctant to abandon the open-flame lamp for the safety lamp, and risk their own lives and the lives of their fellow workers with the one rather than to be hampered by the other.

"When small electric bulbs, with their clear, white light, and small electric storage batteries became available, the advantage of combining these elements for a miner's lamp seemed manifest. The combination looked simple and safe, but was soon found to have elements of danger and weakness peculiar to itself.

"The Bureau of Mines showed, in 1911, that the breaking of a miniature electric bulb in an inflammable mixture of gas and air might ignite the mixture, so that only the fragile glass of the lamp bulb might stand between the miner and injury or death. There was also a possibility that sparks from the small battery would ignite gas, and the accidental spilling of the contents of a battery on the miner's clothing or skin was a possible source of injury.

"The first portable electric miners' lamps that were carried in the hand, or with the battery strapped to the back and the light carried on the head, were exceedingly crude and were designed without appreciation of the sources of danger. The possibility, however, of producing a safe and practical miner's lamp by the proper combination and design of the elements available promised to increase safety so greatly that the Bureau of Mines attempted to stimulate better design and construction by careful investigations and the establishment of an approval system that would be an assurance to the miner and an advantage to the maker of the lamp. As a result various manufacturers submitted types of lamps, cords and bulbs for test and cooperated with the bureau in efforts to so improve the safety features of these devices that the lamps would pass specific tests for approval."

Copies of this bulletin may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D. C.

Economical Generation of Power at Thermal Coal Mines—I

By JOHN B. C. KERSHAW
9 Grosvenor Road, Colwyn Bay, North Wales

THE wastes occurring in power-generating plants are in the aggregate stupendous, and nowhere are wastes more glaring than at coal mines, where fuel is cheapest. This article is the first of a series that will deal with the waste fuels available at mining plants and their utilization. The subjects of boiler-house equipment and control will be dealt with from the chemical engineer's standpoint, and the most recent improvements in design and in the methods of operating boilers and their accessories will be described in detail. Scientific control of the boilers and engines pays, and both self-interest and patriotism demand that it should be introduced without further delay into all power plants of collieries in the United States.

ACCORDING to a statement made recently by Van H. Manning, Director of the United States Bureau of Mines, the weight of the fuel wasted by inefficient methods of consumption in the United States last year was 150,000,000 tons, or 25 per cent. of the total output of 600,000,000 tons. The value of this wasted fuel was half a billion dollars. Owing to the great abundance of coal in the American Continent and to its comparatively low price before the war, wasteful methods of burning it for industrial and manufacturing purposes had been allowed to continue in existence, especially in steam-raising and power-producing plants attached to collieries.

As regards the proportion of this wasted fuel which may be attributed to the coal mines, I estimate that about 26 million tons, or one-sixth of the total waste, is due to inefficient methods at the power plants. This figure is arrived at by the following calculation. The census of production carried out by the British Government in 1907 showed that 2,293,000 hp. was employed in the mines of the United Kingdom in raising 266,000,000 tons of coal. This would be equivalent to 5,159,000 hp. upon the present output of 600,000,000 tons in the United States. Adding 25 per cent. for the more common use of mechanical coal cutters in America, as compared with the United Kingdom, we arrive at an estimated total of 6½ million horsepower for the requirements of the American coal-mining industry. Assuming that 1½ lb. of coal can be saved per horsepower-hour, we have an aggregate saving of 4400 tons of coal per hour, or 528,000 tons per five-day week. This is equivalent to 26,400,000 tons for a year of 50 weeks.

In the largest and most up-to-date central power plants at the present time about one-fifth, or 20 per cent., of the heat energy of the coal can be converted into useful work; whereas in the smaller power stations the efficiency is not much above 10 per cent. and the average for the whole country probably nearer 5 than 10 per cent.

Studying the heat losses in the boiler house and engine room separately, one may say that the majority of mine managers are allowing their boilers to work with a thermal efficiency of less than 50 per cent., and that they are using from 50 to 100 lb. of low-pressure wet steam in order to obtain one indicated horsepower-hour; whereas the best practice attains a 75 per cent. efficiency in the boilers and only requires 10 to 12 lb. of steam for the generation of an equal amount of power from the engines. The wide gap that separates the highest and lowest results is partly caused by the lack of scientific methods of management and control in the boiler house and engine room, and partly by the use of equipment that ought to have been scrapped years ago.

The importance of fuel in relation to power production is that it forms the chief item of cost; and now that fuel has increased in value from 50 to 100 per cent. in all countries as compared with prewar days, the question of burning it so as to obtain the highest possible efficiency has become one of international importance. Coal-mining companies, however, obtain their fuel at a low cost at the pitmouth, with no freight charges to pay, and it is on this account that they have been indifferent to the amount consumed in their steam-raising plants. It is high time they remembered, however, that every pound of coal saved by them is so much added to the national fuel resources and that a power-plant which wastes fuel is wasting many other valuable things.

Assuming then that the manager of a coal-mining company has decided to give some personal attention to his power-plant costs, with the desire to reduce all waste, his first step should be to have samples taken and tests made by some competent coal expert of all the various classes of fuel raised from the mine, following the methods of sampling and testing described in *Coal Age*, issues of Feb. 24, Mar. 3 and 10, 1917.

The results of this chemical and calorific examination of the fuel from his operations would prove of double value. In the first place he would be in a better position to deal with clients who demanded information (or guarantees) concerning the quality of the fuel bought under contract. In the second place he would be able to judge which class of fuel it would pay him best to burn in his own plant, and also what type of furnace would give the highest efficiency with the fuel selected, before any actual changes were made in the existing conditions. The aim, therefore, would be to adapt the boilers and methods of firing to the fuel, and not, as is often the case, the reverse plan. As a general rule it will be found most economical to use for the power plant the cheaper varieties of fuel produced at the mine, for which there is the least outside demand, owing to their fine state of subdivision and high percentages of moisture and ash.

The breeze from coke screens and refuse from washing plants in some cases will be included with these classes of fuel, where the coal-mining company operates also coke ovens or washing installations. In order to burn satisfactorily such types of fuel for steam-raising purposes, however, special types of furnace grates or a

gas producer are required. The remainder of this first article of the series will therefore be devoted to facts and figures based on the most recent practical trials in Germany, England and America with low-grade fuels.

As regards the different classes of low-grade fuels, Butow and Dobbelstein—two German engineers who carried out exhaustive trials of these fuels for steam-raising purposes in the years 1910-11 for the Westphalian Mine Owners Association—adopted the following classification: (1) Coarse-grained material with ash contents up to 50 per cent. and water up to 20 per cent. (2) Fine-grained material with ash contents up to 40 per cent. and water up to 30 per cent. (3) Small-sized coke and coke breeze with ash contents up to 30 per cent. and water up to 20 per cent.

The results of all their work with these fuels were published in the German mining paper *Gluckauf* and may be summarized as follows: Fuels of Class 1 they consider can be burned directly without admixture with other fuels; but they give little heat and the steam-raising capacity of the boilers is extremely low. Fuels of the other two classes yield better results and are best fired together, the fine coal dust from a rich bituminous fuel and coke breeze forming a most excellent fuel material for steam boilers. Forced draft increases the boiler efficiency with this mixture but is of little advantage in burning the materials coming under Class 1. Gasification in special types of gas producers is the best method to follow when only very low boiler efficiencies can be obtained with the solid fuel.

TABLE I. TYPICAL BITUMINOUS FUEL (DRY)

Elementary Analysis	Per Cent.	Approximate Analysis	Per Cent
Carbon	72.6	Fixed carbon	58.04
Oxygen	7.2	Hydro-carbon, etc	29.10
Hydrogen	4.8	Ash	12.86
Sulphur	1.6		100.00
Nitrogen	0.7		
Ash	12.9	Coke	70.90
	99.8		

All fuels containing over 20 per cent. of volatile matters are classed as bituminous.

Combustion of Solid Fuel

Considering, first, examples of the use of low-grade or waste fuels at coal mines in the United States for steam-raising purposes, the power plant at the Cadogan mine in Armstrong County, Pennsylvania, described in *Coal Age* of Dec. 2, 1916, may be referred to. The fuel used here consists of 50 to 75 per cent. refuse from the tipple picking tables, mixed with slack. The boilers are of the Heine water-tube type, rated at 470 hp., and are provided with mechanically operated underfeed stokers, worked with forced draft. Two direct-coupled steam engines work the blower fan, and the ash is removed continuously from the discharge end of the furnace by steel cars. The generating plant consists of two 375-kw. alternators, coupled direct to Corliss-valve steam engines. The electric current is generated and transmitted at 2300 volts and is used for cutting, hauling and pumping purposes about the mine, being converted into direct current at 250 volts by motor generator sets located at the various points where it is required.

A larger and more notable American example of the use of low-grade fuel for power generation at a colliery is that found at Hauto, Penn., near the mines of the Lehigh Coal and Navigation Co. Here the refuse from the washing plant for the ordinary commercial sizes of anthracite tests 9000 to 11,000 B.t.u., but on account of its fine state of subdivision there is no profitable sale for it. A plant has therefore been erected capable of producing over 30,000 kw. from this refuse fuel, and its enlargement to 100,000 kw. is contemplated.

The original plant consists of eight double-ended boilers and three turbo-generators, each of 12,500 kw. capacity and generating current at 11,000 volts. When running at full load and their maximum efficiency, these generators consume only 12.3 lb. of steam per kilowatt-hour. These boilers are provided with hand-fired dumping grates of special design, 12 ft. deep by 8 ft. wide. These grates have about 6 per cent. of the grate area taken up by air apertures, the holes or slots being $\frac{3}{32}$ in. wide and the openings either of the Acme slotted-top or of the pin-hole type. The apertures are at the bottom of grooves extending across the grate tops at right angles to each other in order to prevent the fine coal dust from choking up the holes.

The space over the grates is provided with double arches $9\frac{1}{2}$ ft. long, with channels for heating the incoming air and also for keeping the arches cool. This space forms a combustion chamber in which the gases from the fuel are thoroughly mixed and burned before passing up among the water tubes of the boiler. Other features of the furnaces are vertically sliding furnace doors, recessed ash-pit doors and shaker handles to prevent obstruction in the firing aisles. Two boilers are provided with automatic traveling grates based on the Coxe design.

The boilers are of the five-drum bent-tube type. They are provided with superheaters and work at 225 lb. steam pressure. The electric current is generated at 11,000 volts but is raised to 110,000 volts for transmission purposes. This current is supplied to various cement mills and coal mines located near to the Hauto generating station. Eventually, when the station is completed, it is hoped to provide the cities of New York and Philadelphia with current from this waste-fuel station, further details of which will be found in the *Electrical World* of May, 1914.

TABLE II. STAGES OF CHANGE IN FORMATION OF FUELS

	Percentages C.	N. & O.	H.
Wood (cellulose)	44	50	6
Peat	60	34	6
Lignite (brown coal)	67	27	6
Bituminous coal	85	8	5
Semi-anthracite (steam coal)	88	6	4
Anthracite	94	$2\frac{1}{2}$	$1\frac{1}{2}$

NOTE.—Ash is deducted in all the above test results.
The three gases—oxygen, hydrogen and nitrogen—are believed to be present in the solid state in the above fuels—before heating.

For the utilization of fine coal dust, such as that produced in some washeries from dusty fuel, and also that collected from the floors and ledges of dusty mines, the Bettington vertical tubular boiler is probably the most suitable and efficient. This boiler is now well known, and some of the latest tests with it will be found in the *Journal of the Society of Chemical Industry* of May, 1917.

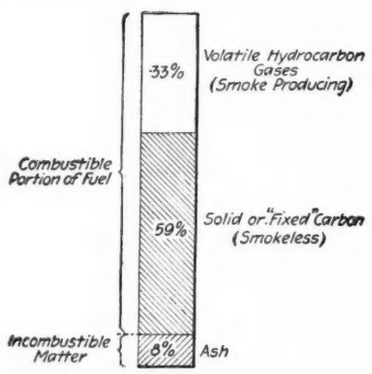
The chief difficulty in operating this boiler at present is to find a refractory material which will stand the combined effects of the high temperature attained by the combustion of the dust fuel and of the molten ash formed. But in time no doubt these difficulties will be surmounted. It must be understood, however, that

it will not pay to specially pulverize low-grade fuels for use in this or in any other type of tubular boiler, and that if the fuel is too large or coarse to be carried with the air current into the combustion chamber some other method of burning it must be adopted.

As an illustration of the evaporation and boiler efficiencies that may be obtained with various types and mixtures of waste fuel, the following results are quoted from Butow and Dobbelstein's report, a traveling-grate stoker and a Dürr boiler with a heating-surface of 1640 sq.ft. being employed for the tests. Fuels containing from 9 up to 22 per cent. of ash and from 2 to 13 per cent. of water were used. Neither the fine coal dust from the coal-washing plant nor the coke ashes could be burned alone. The following are the results:

	No. 1	No. 2	No. 3	No. 5
Lb. of steam per lb. of fuel burned	5.61	4.96	4.16	4.45
Boiler efficiency, per cent	58.96	53.18	42.93	48.74

The fuels used in these tests were: (1) Rejected fuel from the washing plant; (2) the first-named fuel mixed



TYPICAL COMPOSITION OF A BITUMINOUS COAL

with coke ashes (2 to 1); (3) dust from nut coal mixed with coke ashes (3 to 1); (5) fine coal dust and rejected fuel from the washing plant (1 to 1).

The chief difficulties met with in gasifying low-grade fuels are due to the high percentage of ash which they contain, and also to the fine state of division in which they are brought to the gasification plant. The more recently designed producers, however, have given successful results, even with the most unpromising raw materials; mine owners have therefore now the option of burning their waste fuels either in the solid or gaseous state. Local conditions must decide in each separate case as to which will be the more advantageous method to employ.

The producers which yield the best results with these low-grade fuels possess some form of revolving eccentric grate, and in the latest forms the speed of revolution and the degree of eccentricity possessed by the grate can be varied to suit the amount of ash in the fuel. The ash is removed automatically from the producer, and even when the ash fuses and clinker is formed the larger masses are crushed by the action of the eccentric hearth, and choking is avoided in the lower and hottest part of the producer.

A notable example of the use of a water-jacketed producer of this type is given by Fernald in Technical Paper No. 128 of the Bureau of Mines. The producer in this case was installed to use up some refuse coal (or "batts") at a large English colliery and iron works. The larger pieces of coal and shale were crushed, and the whole of the fuel was washed before passing to the producer plant, the ash being reduced in this way from 52 to 24 per cent. and the calorific value of the fuel being increased from 5065 to 9869 B.t.u. per pound. The slag from the producer contained only 4 per cent. of combustible matter, and the gas obtained was regular in volume and composition.

Butow and Dobbelstein, in the report already quoted, give some figures obtained with a similar type of producer when a mixture of equal proportions of coke ashes and refuse from the washing plant and sorting tables was employed as raw material. The gas in this case was burned under a Lancashire boiler with successful results, and the cost of evaporating 1000 kg. of water (2204 lb.) was stated to be only 24 cents.

Finally, some figures given by Mann and Müstefeld, as the results of tests made in 1912 with a Kerperly high-pressure gas producer, may be quoted. This producer is specially designed for gasifying finely divided low-grade fuels and is provided with a great depth of fuel bed and with a revolving eccentric hearth to prevent choking.

The following are tests of the gas made by this producer in six separate runs:

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Carbon monoxide, per cent	30.20	26.66	21.90	27.40	32.50	29.5
Hydrogen, per cent	14.85	15.01	22.20	18.30	12.30	14.5
Marsh gas series, per cent	0.40	1.90	2.00	2.50	...	1.4
Carbon dioxide, per cent	3.00	5.18	10.00	7.00	2.4	4.1

In conclusion, reference may be made to the following publications of the United States Bureau of Mines, which contain most valuable information on the subjects of power production from refuse and waste fuel: Bulletin No. 4, R. H. Fernald, 1910—Features of producer gas power plants in Europe. Technical Paper No. 20, C. D. Smith, 1912—The slagging type of gas producer. Technical Paper No. 123, R. H. Fernald, 1915—Notes on the use of low-grade fuels in Europe.

(*To be continued*)

Roll of Honor of Men Who Have Taken Course in Rescue Work

The Bureau of Mines, Department of the Interior, in a report issued recently, prints as a roll of honor the names and addresses of the miners throughout the country who have taken the bureau's course in mine-rescue work from July 1, 1914, to June 30, 1916. Copies of this report are being sent to every mine operator and state mine inspector in the country, in order that in the event of a disaster in his district or at his mine, he will be able at once to determine the nearest available trained men for rescue work. Mine owners in the past have coöperated in this manner as much as they could, but have sometimes been badly handicapped and delayed in endeavoring to learn which miners have been trained in rescue work. The report gives the names and addresses of more than 3000 men.

Have you been promoted? Do you intend to make a change from your present position? Have you already got a job with a new company? Are you rehabilitating your present plant or constructing new additions? If so, write "Coal Age" a short item to that effect for its news columns. Your many friends in the industry will be glad to learn of your progress.

Court Decisions on Labor Questions

An unusual array of important decisions is presented by the Bureau of Labor Statistics of the U. S. Department of Labor in its annual compilation of court decisions on labor questions, just published as Bulletin No. 224. A number of the decisions of the Supreme Court of the United States, handed down since December, 1916, are included in this bulletin, but for the most part the decisions were made in the calendar year 1916.

Most notable among the Supreme Court decisions, on account of the circumstances attending the enactment of the law construed by it, is the decision sustaining the constitutionality of the Adamson 8-hour law for trainmen in interstate commerce, and declaring at the same time the right of Congress to compulsorily arbitrate disputes between the railroads and their employees for the benefit of the public.

The first broad decisions ultimately deciding the constitutionality of workmen's compensation laws are also noted in this volume. Although a number of state courts of last resort had passed upon laws of this type, it was not until the Supreme Court of the United States had given the seal of its approval that the matter could be considered as finally settled. In upholding the compulsory compensation law of New York and of Washington, the latter also providing for a compulsory state insurance fund, the farthest reach of compensation legislation has received judicial approval. The elective law of Iowa was likewise sustained.

Oregon Ten-Hour Law Sustained

Another important decision by this highest court was that sustaining the Oregon 10-hour day for factory employees without regard to sex or age—a marked reversal of position from the action of the same court in 1905 in holding the 10-hour law of New York applicable to bakeries unconstitutional; the power of the state to enact laws limiting the hours of service of adult males in private employment, as well as the hours of females and of children, is now recognized. The fixing of wages for women and minors under eighteen is also a valid exercise of the police power according to another decision of this court, the Oregon minimum wage law being left undisturbed in its position of constitutionality as determined by the supreme court of that state; on this point the Federal supreme bench was equally divided, one justice not voting.

Of hardly less interest than these decisions of the Supreme Court is the action of the court of last resort of the State of Massachusetts in declaring unconstitutional an act of that state which undertook to limit the issue of injunctions in labor disputes, declaring that injunctions should issue only when property rights are affected, and that labor is not property. The court took the view that this attitude excludes from the protection of the law those who had no other property than their right to work, and held that such a deprivation could not be effected by statute.

Besides the decisions of the Supreme Court on the subject of workmen's compensation, the bulletin contains numerous decisions and rulings by the state courts, questions of construction and constitutionality being involved. The Kentucky court of appeals, which had declared unconstitutional the workmen's compensation law of 1914, found the enactment of 1916 conformable to the tests of validity established by it; while the supreme court of Texas sustained the compensation law of that state in all points as against an opinion of a subordinate court that the provision was void which took from employees of accepting employers their option to accept or reject the act.

The point that continues and apparently will continue to furnish the greatest number of cases for determination is found in the phrase which appears in most of the compensation laws—"injury arising out of and in the course of employment." In the State of Washington, however, the law does not contain the limitation, "arising out of employment," so that discussion of this point is avoided, the supreme court of the state saying that the employee "is the soldier of organized industry, accepting a kind of pension in exchange for absolute insurance on his master's premises."

No less prolific of litigation is the Federal liability law covering railroads in interstate commerce, since not only must the employing company be an interstate carrier, but the injured person must at the time of his injury have been employed in interstate commerce; it is only when he is so employed that he can claim the benefits of the act, while, on the other hand, if so employed he is restricted to such recovery as that statute provides. With the wide extension of compensation legislation (now found in 37 states), there is constant contrast, not to say conflict, between the two classes of remedy—that is, by compensation and by suits for damages; furthermore, as appears from a number of the cases discussed in this bulletin, it is frequently a practical impossibility to determine whether relief should be sought under the one law or under the other until the evidence has been submitted to a jury and a verdict rendered. While therefore such a compilation of decisions, selected for their particular interest as illustrating the various legal phases of the labor question, possesses an attraction for every student of labor, it is of especial value as indicating those points in our legislative system which require attention, to the end that more certain and prompt adjustments may be made of the rights of the respective parties to labor contracts. At the same time, certain boundaries are indicated which cannot be passed without an alteration of constitutions, or at least of views of constitutional interpretation. Evidence is not lacking of changes in both these respects.

Two Narrow Roads Instead of One Wide Road

In Italy there are numerous single-track roads through the mountains, whereon traffic is permitted to travel only in one direction, according to *Engineering and Contracting*, Sept. 5, 1917. This, of course, necessitates two parallel roads to accommodate traffic in opposite directions, but it has been found not only that two narrow roads can usually be built more cheaply than a single wide road but that there are fewer accidents, for collisions are impossible. A narrow side-hill cut can often be made entirely in earth where a wide side-hill cut would run into rock. Moreover, where the traffic is entirely in one direction, sharper curves can be used.

Coal Conveyor in a Thin Bed

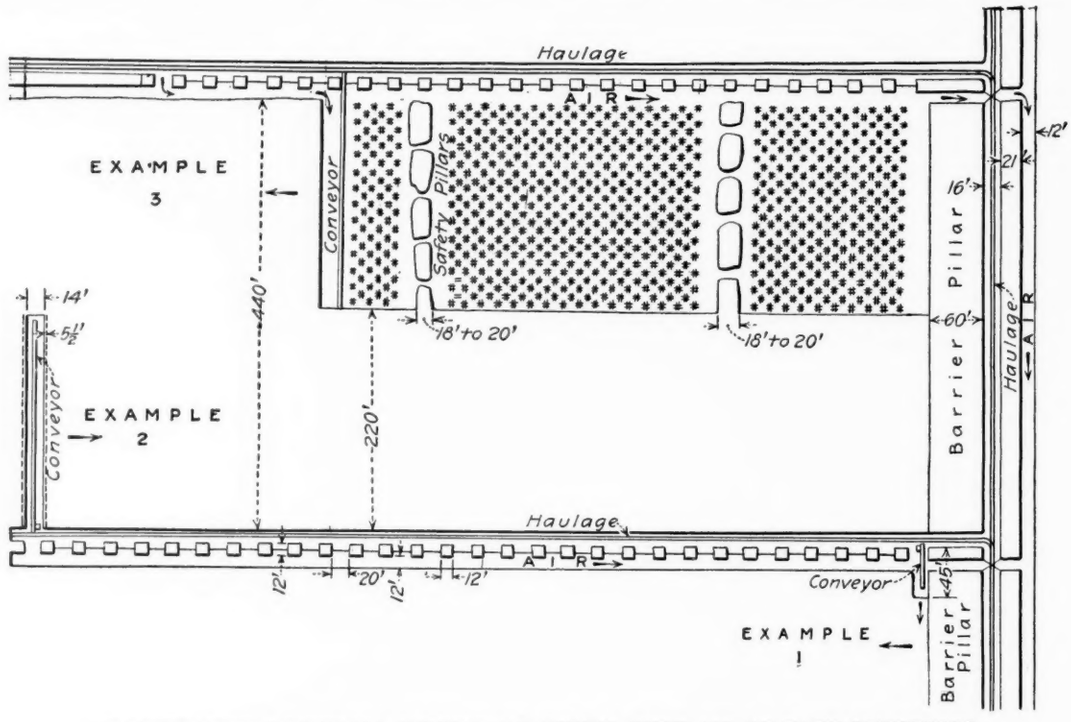
By D. C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS—*Being a thin bed of coal with another bed above, it is necessary to support the roof or lower it gradually. The room-and-pillar method was found to be too expensive. Longwall method of mining was adopted, using face conveyors. The roof is lowered gradually on timbers, not disturbing the workings above. A mining machine is used to undercut the coal. Old timbers are used for cogs.*

CONVEYORS for transporting coal along the mining face in the surface seam of the Dodge mine of the Delaware, Lackawanna & Western R.R., Coal Department, Scranton, Penn., was introduced about five years ago by David Lloyd, who was then the superintendent. The coal in this mine varies from 16 in. to 34 in. in thickness and lies in any position from vertical to horizontal, although most of the coal is found in small pitches from flat up to 10 deg. The cover over the coal varies from 80 ft. to 150 ft. in thickness. About 100 ft. above the coal in which the conveyors are working is another bed about 5 ft. thick, which is being mined by the same company from a different plant. The existence of this upper bed made it necessary either to leave sufficient supports to hold the roof or to mine the coal in such a way that the roof could be lowered gradually, so as to prevent cracks or fissures forming such as would break through to the upper measure.

When the mine was first opened, the company tried to work the lower bed by the regular room-and-pillar method. Headings were driven 12 ft. wide and sufficient rock was lifted or blasted down to make the headings and airways 7 ft. in the clear. The preference was given to the lifting of bottom wherever that plan was feasible. The same course was pursued in the construction of the roadways of the rooms, and as a result 4½ ft. of rock had to be handled for 2½ ft. of coal. It was found that this method of mining was too expensive, not only because of the large amount of rock to be disposed of, but also because of the large pillars that had to be left to support the upper bed. So some other method had to be devised.

It was then suggested that the mine be operated on the longwall system, using conveyors to carry the coal from the working face to the heading and letting the roof down slowly and gradually. As in the first plan adopted, the clearance between the heading of one pair of entries and the airway of another was 220 ft. Sufficient top or bottom was taken to make both heading and airway 7 ft. high in the clear. Wherever possible bottom was taken in preference to top, so that the coal would be above the tops of the mine cars. In this case the longwall was only used advancing.



ILLUSTRATING LONGWALL METHOD OF MINING WITH AID OF FACE CONVEYORS

It was decided to change this system and drive the headings with a distance of 440 ft. between the airway of one pair and the heading of the other pair of entries. This permitted the saving of one-half of the narrow work and allowed the working of large pillars both advancing and retreating. Furthermore, instead of taking up bottom in the airway it was left in place. A chain pillar was formed 12 ft. square with 20 ft.

between pillars. These openings were well bratticed.

Between the main heading and the first cut advancing, and the last cut retreating, a barrier pillar was left 60 ft. in thickness. Then the first cut was prepared for by driving a doghole 45 ft. long and 14 ft. wide, by shooting off the solid (see Example 1 in the accompanying diagram). Owing to the fact that the airway is 12 ft. wide and the chain pillar 12 ft. thick, it is only necessary to drive the doghole in 21 ft. when driven from the airway, but 45 ft. when driven from the heading. The coal from the doghole is moved to the heading by hand.

As soon as the doghole is driven in 45 ft., a Goodman shortwall mining machine is taken in and the coal undercut. The front end and the take-up end of a Jeffrey conveyor are then placed in the doghole, 4 ft. of the conveyor being allowed to project into the heading over the track. As the doghole is driven in the conveyor is extended by pulling the take-up end 16 ft. forward by the coal cutter and then inserting a 16-ft. section of conveyor. Each section of conveyor consists of 61 to 63 links, each link being 6 in. long. The take-up end is so arranged that it will take care of from two to three links. These links travel in a steel trough. The top of the trough is 10 in. above the floor of the room.

Owing to the fact that the coal cutter is 26 in. high, and that 28 in. is the thinnest coal in which it will work, it is necessary when the coal is less than 28 in. thick to take top or bottom, or both, to get the necessary height.

How the Coal Cutter Is Worked

As soon as the doghole has been driven in 220 ft., or a shorter or longer distance depending on the character of the bed, the coal cutter makes a cut along the inside rib from the end of the doghole to the airway, and then cuts back on the other rib to the end of the doghole, as shown by Example 2 in the diagram. This is done so as to get two cuts without moving the conveyor. This doghole is completed in three days of three shifts each.

As soon as the coal cutter has finished the cut, laborers load out the coal. Each laborer is apportioned a certain amount to load, depending on what a man can do in a day's time. The men are changed in their positions for loading each day. First the conveyor is measured off into spaces of equal lengths. These are numbered, say from one to ten, ten being the number nearest the discharge end of the conveyor. The man that has Section 10 one day is moved to Section 1 the next, each man moving up one place.

This is done every day because the men farthest from the discharge end of the conveyor finish loading first, owing to the fact that the conveyor is fullest at the discharge and less room remains for the men at these sections to load into.

The mine cars are run under the end of the conveyor and the coal is discharged directly into them. One conveyor runner attends to the operation of the machine and one topper-off is used to oversee the loading of the cars. In case the run is heavy it may be necessary to use an extra topper-off.

As soon as coal is loaded out one miner (called a "plugger") goes along the wall and straightens it up, either with pick or by shooting if necessary, so that the cutting machine will have a straight face to work on.

The night timber boss comes on with four laborers, and with the assistance of the machine runner and his helper (called a "kailer") they move motor and conveyor over 5½ ft. This is accomplished with the aid of the coal cutter and some chain hoists. This 5½-ft. movement of the conveyor is equal to the depth of undercut made by the machine.

As soon as the conveyor is moved it is reversed, and the timber is sent up the conveyor to the working place. One of the five timbermen sends up the timber, and the other four unload it at proper points and build cogs. These cogs are 4 x 4 ft. and are set about 5 ft. apart, staggered in close rows as shown in Example 3 in the diagram.

While timbermen are thus employed, the machine runner and kailer proceed with their cutting, which takes, on the average, about 6 hours. The night miner and laborer drill about 14 holes in the 220-ft. face and shoot the coal down for the next day's loaders.

Coal cars having a capacity of 3 tons can be loaded in 2 min., and the conveyor chute will hold three car loads of coal at one time. The conveyor can carry a lump of coal as heavy as two men can lift. The limit of the size of lump that can be carried is determined solely by the clearance between the conveyor and the roof.

The face of the longwall is kept advancing in this manner until the timbers begin to squeeze, when the work is then stopped, a pillar of about 18 or 20 ft. being left. A new doghole is then driven up and the work continued until another squeeze comes on. When all of the heading is worked out these pillars are pulled so that there is no coal lost, and almost perfect extraction is obtained.

When the coal over a large area is removed the roof rests on the wooden cogs and the pressure gradually crushes them, letting the roof settle slowly and causing but few breaks. The cogs are made of old railroad ties, bridge timbers or anything that cannot be used for other purposes. This material, however, must not be rotten.

History of Wire Hoisting Ropes with Notes on Factors of Safety*

Stranded bronze-wire ropes were found in the Pompeian ruins. Modern wire ropes were a development of the 19th century. In recent American practice, imported steels have been supplanted by acid openhearth steel of domestic manufacture. Bending stresses of wire ropes vary inversely as the diameter of sheaves and drums, and reverse bending due to underwound drums will decrease the life of a rope from 10 to 25%. Rope ends are preferably fastened by means of clips instead of sockets, and ropes should be protected from corrosion and frequently inspected.

THE application of wires in the form of ropes for engineering purposes was first introduced in 1813 for use as supporting ropes on the Geneva suspension bridge. They were, however, not constructed in what today would be strictly classed as wire rope, but were formed of a series of wires laid parallel with one another and bound together by means of smaller wires which in turn were covered with tarred yarn. There seems to be no authoritative data available as to the number and sizes of the individual wires used in making up the supporting ropes for this bridge, but it is taken for granted that the material from which the wires were produced was undoubtedly charcoal or BB iron which at that period, and for some time later, was almost exclusively used in the production of wire ropes.

At a later date, 1835, some ropes of this type were produced for the Freiburg suspension bridge, which has a span of over 800 ft. in the clear. The supporting ropes for this bridge were composed of about 20 bundles of iron wires laid parallel, each wire being 0.125 in. in diameter and the combined total making a rope about 5½ in. in diameter. There is no doubt that this type of rope, when properly constructed, would present a breaking efficiency nearly equal to the tensile strength of its individual component wires, and perhaps it is the only wire-rope construction in which each wire bears as nearly as possible its due and proportionate share of the load stress. Ropes of this class, while not extensively manufactured, have been applied in this country on the Niagara suspension bridge and the Ohio River bridge and have been used for the large main supporting cables on the Brooklyn suspension bridge; also more recently on the new East River or Williamsburg bridge. This type of wire rope is known as the "selvagee" construction. Unfortunately it cannot be utilized for hoisting purposes.

In 1834 a mining engineer named Albert, of Clausthal, Germany, interested in the mining industries in Saxony, who became later the director of the Hanoverian mines, finally succeeded in fabricating, with considerable difficulty, a "stranded" wire rope composed of iron wires. He put this rope in operation for hoisting ore in the shafts of the Harz mines, where its superiority was immediately recognized over its hempen predecessor; and Albert's efforts were crowned with success. In 1837 Albert, before an engineering society in Berlin, read a paper on the construction and manufacture of stranded-wire ropes. This paper advocated the production of wire ropes along the same lines of construction as were previously applied to the manufacture of hemp and fiber ropes, then employed exclusively in the mining industry. The size of the wire entering into the manufacture of the first stranded-wire rope produced by Albert is said to have been 0.144 in. in diameter, with a tensile strength of about a thousand pounds each, or approximately 27.5 tons per sq.in. of actual cross section. As to the exact number of wires in the strands and the number of strands employed there seems to be no absolutely reliable information. However, it is known that ropes manufactured between 1835 and 1838 were made up of four wires to the strand, each wire being about $\frac{3}{32}$ in. in diameter and the ropes composed of four, six and eight strands. It is evident that there was some variation in sizes of wires as the number of strands increased.

Commercial Manufacture of Wire Ropes

It must thus be conceded that as a direct result of Albert's experiments the commercial world was given a mechanical appliance to which can be traced the establishment of many of the foremost industrial activities of modern times. It was immediately after the first successful experiments, carried out by Albert, that a partnership was formed by Felten & Guilleaume, of Cologne, to manufacture wire ropes upon a commercial scale. These two men were quick to realize the possibilities of a product adaptable to numerous enterprises, and for some time manufactured wire rope for mining purposes in Germany and France. In the Musio Borbonico at Naples is to be found on exhibition a short length of bronze-wire rope, about 1 in. in diameter, which was excavated from the ruins of Pompeii, but beyond the fact that it was made of wires twisted into strands, and the strands in turn laid into rope, there is no other information except that it proves to us that wire ropes made of bronze wires were in existence before the destruction of Pompeii in the year 79 A.D. Beyond this period there is no trace of any stranded ropes, but it is an established fact that the ancients, many centuries before the process of drawing wire through dies was invented, made wire from precious metals by hammering.

The application of wires to ropes was known to exist in Germany as early as 1813, but their practical introduction in England did not apparently take place until some years later. Before a meeting of the British Association, held at Newcastle in 1838, Mr. Taylor, F.R.S., read a paper on wire ropes, by Count Brenner, and in the same year R. S. Newell, of Dundee, England, acting upon information and advice from a friend who was studying mining conditions in Saxony, designed some rather crude machinery for the purpose of manu-

*Paper read by M. H. Sigafoos, general manager, Hazard Manufacturing Co., Wilkes-Barre, Penn., before the mining-section meeting of the sixth annual congress of the National Safety Council, New York, Sept. 12, 1917.

facturing wire ropes with four strands, each strand containing four wires. Mr. Newell carried on some experiments with his early inventions, on which he gradually improved, until in August, 1840, he was granted his first letters patent in England for improvements in the manufacture of wire ropes and the machinery designed for the process. With these improvements there apparently came the introduction of cores or "hearts," as such were then termed, as Mr. Newell's patent related to the construction of rope with wires laid around a core or heart to form the strand, and several strands laid around a central core or heart to form the finished rope. After these letters patent were obtained by Mr. Newell a company was formed, and under his personal supervision wire ropes were manufactured in England on a commercial scale.

History of American Wire Ropes

In the United States wire rope was first manufactured in the early 40's and has been improved upon year by year until the present time, when it represents the very highest development of this means of hoisting and haulage. In the last fifty years there has been a gradual change from the use of one kind of rope material to another, and this was brought about by the demand for an increased production by speed and efficiency. In the preceding paragraphs I have shown that iron was practically the only material used for wire rope, and this continued to be the case until the introduction of crucible cast steel, which opened the second period in the manufacture of wire rope. The third period came with the introduction of higher-carbon steel, known by the trade as plough and special high-strength steel. In none of these periods has the material in the production of wire rope of the preceding period been forgotten, for certain operations still demand iron cables and there are other operations in which it is out of the question to substitute plough steel or the special high-strength steel for cast steel.

Materials Used in Manufacture of Ropes

The material entering into the manufacture of wire ropes is perhaps of greatest importance in the wire-rope industry, for upon its quality depends largely the final result of the finished product. Through careful selection, constant experimentation and analysis, with minute researches into the physical and chemical properties of the raw materials, the industry is guided toward the production of a dependable wire rope with durability and ductility as two of its fundamental qualities.

Until recent years in the manufacture of wire rope it was generally conceded that the foreign steels were by far the best, due principally to the use of Swedish ores. Foreign steel material as imported by the American manufacturer for wire rope purposes is made to meet rigid specifications. This insures as nearly as possible a uniform quality. Such steel is carefully tested and analyzed to verify the percentages of manganese, silicon and carbon as well as of sulphur and phosphorus, which must be extremely low. Acid open-hearth steels are generally admitted to be of better quality than basic openhearth and it has been suggested that this is due to the higher oxygen content in the basic steel.

Much has been claimed for the qualities of chemically treated steels, such as vanadium, chromium, etc., and in many instances the manufacturers of steel products have proved the claims made for them. So far as their use in the manufacture of wire rope is concerned, however, they are still in the experimental stages, and no data are available at this time. Without doubt such elements may eventually be used in connection with domestic ores and a finished article be produced for the wire-rope industry similar to the articles that have been produced in other industries.

Wires made from materials intended for the manufacture of wire rope for ordinary purposes are divided into three classes, as previously stated; namely, iron with a breaking strain of approximately 80,000 lb. per sq.in., cast-steel, often erroneously called crucible-cast, which has a breaking strain of 170,000 to 180,000 lb. per sq.in., and plough-steel with a breaking strain of 200,000 to 250,000 lb. per sq.in. Wire of higher tensile strength is often drawn, but this is rarely used for any other purpose than for standing rigging on racing yachts, where maximum strength with the lightest possible weight is essential. Such wires are sometimes drawn to 260,000 lb. per sq.in. Small sizes of even higher tensile strength are drawn for wire rope or strands for aëroplane guys.

Life, Stresses and Speeds

There has been much discussion on the question, When has a wire rope reached the end of its usefulness, and when should it be removed? Up to the present, it seems, the question remains unanswered—at least, satisfactorily. In an exhaustive investigation[1] conducted by the Bureau of Standards on this subject the recommendation was made that a rope should be removed after a certain number of broken wires appear in each of the strands. These tables have undoubtedly been compiled from stated loads, speeds, head-sheave and drum diameters; from shafts of various depths, the torsional and load stresses being taken into consideration. It is, no doubt, a useful guide, provided it can be applied where conditions are the same or as nearly alike as those from which these tables and figures were compiled. However, as there is no standard of sheave and drum diameters, except those recommended by rope manufacturers, or any set rule for maximum loads, it is evident that with each variation in the diameter of sheaves or loads there will be a variation in the bending and load stresses. Both stresses are of great importance and each has a direct bearing on the factor of safety. The various conditions of operation that exist in different mines make it almost impossible to find any two that are alike. There can always be found considerable differences in the diameter of sheaves, loads and speeds, therefore it is obvious that no set rule can be laid down by which all mining operations can be governed.

In the catalog of the wire-rope manufacturers are to be found the "proper working loads" of wire ropes for the given sizes and grades. This proper working load in almost all cases is approximately 20 per cent. of the breaking strength of the rope, and would appear to be a factor of safety of five. This, however, is not the

[1]Bull. 75, U. S. Bureau of Standards, Washington, D. C.

case, as will be shown, and it is important, in calculating the proper size of rope for a certain load with a required factor of safety, that this proper working load should not be confused with the actual factor of safety.

While the proper working load does show approximately one-fifth of the breaking strength of the rope, it does not by any means indicate that in operation a rope, selected on account of its showing a proper working load in the list corresponding to the load which it is desired to lift, would have a factor of safety of five. This is due to the fact that in addition to the working load there are other stresses to which ample consideration must be given; the most important of these is the stress due to bending over the sheaves and drums. If the rope to be used is operated over standard-sized sheaves and drums, as recommended by the rope manufacturers, the general average of this bending stress equals about 10 per cent. of the approximate breaking strength of the rope.

For instance, in a cast-steel wire rope, of 1-in. diameter and composed of six strands having 19 wires to the strand, the approximate breaking strength is 30 tons and shows a proper working load of one-fifth, or six tons. This, however, is only to be used on a minimum-size sheave or drum of 4 ft., as recommended by the manufacturer. The bending stress would be 2.7 tons, or 9⅓ per cent. of the approximate breaking strength of the rope. It is thus evident that by adding 9⅓ per cent. to the 20 per cent. load stress we have utilized 29⅓ per cent. of the ultimate; and, instead of an apparent factor of safety of five, we actually have only 3.41.

This factor is still further reduced by the stress due to starting the load, and also in some cases by the stress due to the weight of the rope and its inertia. The latter, of course, varies with the size and length of the rope, and in calculating the proper sizes of rope required for hoisting operations, where ropes are often long and heavy, their weight must be considered and added to the ore load, weight of cage and cars, or skip, as the case may be, in order to arrive at any true factor of safety. For short lengths of rope of small diameter, such as used on derricks, etc., this latter calculation is not necessary.

Effect of Sheave and Drum Diameters

It is often impracticable to utilize the sizes of sheave and drum recommended by the manufacturer. When different diameters must be used, the bending stresses will vary inversely as the diameters. For instance, assume in the example given that a 2-ft. diameter sheave is to be used. The bending stress produced would be 5.58 tons, or about 18⅔ per cent. of the breaking strain of the rope. This, in addition to the working load, would be 38⅔ per cent. of the ultimate strength of the rope, thus reducing the factor of safety to 2.6. Under these conditions the total working stress would be greater than one-third of the ultimate breaking strength of the rope when new, and this factor of safety is not considered good engineering practice. Obviously under such conditions a wire rope could not possibly give the same service as when operated over the standard or larger-sized sheaves or drums. On the other hand, if we should employ sheaves of twice the diameter of those recommended by the manufacturers, or 96 in., the bending stress would be only 1.4 tons (approximately) or about 41 per cent. of the ultimat estrength of the rope. It is evident that by reducing the bending stress to a minimum more economical service could be obtained; and in many cases a smaller diameter of rope could be applied to do the required work, thereby increasing the efficiency of the rope and making a considerable saving in first cost.

Regarding bending stresses it might be well to describe briefly the effect of these stresses on the initial structure of the metal in the wire rope. It has been shown repeatedly that reverse bends play an important part in the early deterioration of a wire rope. The under-wind rope in which there are reverse bends will invariably give a shorter service than the over-wind rope. The difference in service of the two ropes on a hoist varies a great deal, but from experience it has been observed that the over-wind rope will give 10 per cent. to 25 per cent. more service. The reason for this is quite obvious, but I shall endeavor to explain as clearly as possible the causes leading to the shorter service of the under-wind rope.

Causes of Short Service of Under-Wind Rope

The under-wind rope as it comes off the head-sheaves has taken somewhat of a set, the permanence of which depends altogether on the relation of rope diameter to sheave diameter. The smaller the sheave, the greater the set. The rope now travels to the take-up drum which is set some distance away and will wind on the drum in the opposite direction to the way it came off the head-sheave. A reverse bend is thus thrown into the rope and consequently into the wires themselves. The rope cannot recover itself in most cases, for the set received at the head-sheave is not entirely overcome before it strikes the take-up drum, and consequently the effect of the latter bend is more severe.

Wires removed from ropes retired from service, operating under conditions of reverse bending, show under the microscope that minute cracks have been set up in the steel, sometimes running in planes between the grains, while in other cases the grains themselves have cracked. Examination made of the steel at different points shows that the nearer the break the more developed are the cracks and fissures. Of course these minute cracks will eventually develop into larger cracks, which will in due course cause the wire to part, and later, if the rope be not removed in time, the breaking of the entire rope.

Another cause for failure of wire ropes can be attributed to repeated shocks. A rope may fail because of combined stresses beyond the breaking strain, or on account of a succession of applied loads in excess of the elastic limit, and it may also fail by reason of repeated shocks—that is, loads applied that may reach the elastic limit at intervals of minutes or hours. The effect of these strains, or over-strains as they may be called, is shown best by a microscopic examination of the metal. They lead to crystallization with a consequent embrittlement of the steel.

A rope will wind on a drum, coil beside coil successively, until the end of the drum or drum flange is reached. At this point the rope will have to wind upon itself. After making the first coil upon itself there is a tendency for the second coil to mount or overlap upon the first. This at once readjusts itself

by the instability of the position, but the act of slipping into place alongside the first coil is accompanied by a sharp snap which always occurs at the same point on the rope. The effect of this is twofold:

1. It will cause jerks that will increase the load on the rope by an amount dependent upon the amount of slack between the drum and the head-sheave. In most cases this is small, but in time the wires will show the effect of these shocks not only from the increased load but also from the vibration in the rope, which usually settles at one point, causing trouble later on.

2. The inner series of wires will crush somewhat from the squeezing between the top and bottom layer and will assume a pear or bell shape. In this disturbed condition it is impossible for the inner wires to perform their proper function, and the outer wires will be forced to take more than their share of the stresses. Not only this but they will also gradually assume the shape of their cushion, the inner series, causing trouble as a result of abrasion.

Of course we know that overlapping cannot be eliminated in most cases on account of the amount of rope that must be taken up on the drum, but the point to emphasize is the fact that frequent inspection must be made of the rope in order to minimize accidents.

The effect of overloading has already been referred to in the foregoing, but in addition it might be well to state that wire ropes are constructed to take care of certain loads, and when these loads are exceeded, the steel in the rope must suffer. The rope as made has a certain lay and the method of attachment to the load has a great deal to do with the running out of the lay and stretch of the rope. This should not be confused with the material itself. There are several methods of fastening ropes to the load, and it can be done by means of either sockets or clips.

Fastening by either of these methods can be done in such a manner as to break the rope before the connection gives out. In the case where sockets are used it was formerly thought necessary to turn or bend back the strands or wires into the basket of the socket. This method is now being replaced by a process of opening the wires in the strand of the rope which is to be socketed, thoroughly cleaning them with muriatic acid, cut down with zinc, and pouring in molten zinc.

Tests of this method of socketing proved that a more uniform strain on each individual wire can be depended upon. However, it necessitates taking great pains and carries with it at all times the danger of no possible means of inspection. The connection made with clips, if properly applied, is equally strong, and careful inspection can always be made of such a fastening. The latter connection should be made with the curved section of the U-bolt clip over the short end of the rope. This insures more safety, as there is then no indentation on the main section of the rope made by the U-bolt. From a safety point of view it is preferable to socketing.

I believe that all users of wire rope appreciate the value of protecting the rope from mine and other injurious waters which corrode and take into solution the steel of the rope, but it might be well to state that the most dangerous element is often neglected. In mine water the sulphur has been taken into solution, resulting in the formation of sulphuric acid, and when this acid attacks the steel there is liberated hydrogen, which causes a great deal of trouble. In order to keep corrosion at a minimum it is absolutely necessary to cover the rope, or at least fill the interstices of the rope, with some sort of protective preparation. A mineral compound of the right consistency has been found to be the proper material to use for this purpose.

In dealing with the problems in which wire rope plays an important part it is most essential that a man be employed who is familiar with the construction of wire rope and its application. This knowledge has resulted in the employment by most mining companies of an inspector. The duties of the inspector are too numerous to mention, but the mere fact that there is such a position emphasizes the point that wire rope is a part of the equipment that requires expert knowledge, careful handling and the most rigid inspection.

In conclusion, I wish to state that the points covered in this paper are the results of practical experience covering a period of nearly three-fourths of a century. During this time the merits of suggestions offered have been proved by test and actual service, and have been adopted as standards by our engineers.

Regarding Doors on Main Haul Roads

By F. A. Pocock
Philadelphia, Pennsylvania

The trapper is a most necessary loafer at present, and there is no reason why he cannot be freed from the job and put to some work that will pay him better and at the same time tend to greater tonnage. A number of attempts have been made to make the ventilation doors open and close by power, but I do not know of any that have really been successful so far, and the reason seems to be the difficulty in opening the doors against air pressure.

When a door, say 6 x 6 ft., is in a main airway and there is, say 3 in. water gage, of course there is a pressure on the door of something over 560 lb. The door will weigh about 400 lb. There must be two doors spaced more than the length of the trip apart, therefore it is easy to balance the pressure between these doors so that the power apparatus will only have to move the weight of the door.

If the doors are made with one or more shutters, opening with the pressure and closing by gravity, easily operated catches will hold the shutter against the air pressure. The present doors can be equipped with these shutters at small expense, and even if the doors are not on an electric haulage road they can be operated by mechanical means.

Double doors have been operated successfully in mines where the roof is strong, but the mine worker has a deep-rooted preference for the single door. When it is closed the air pressure will keep it closed, and the pressure will generally overcome any small coal or rock that may interfere with its closing; also, there is not the necessary rod and crank connection that there is with the double door.

It seems to me that there are a number of places in the mines that can be equipped with mechanical contrivances to free a small percentage of the help. Getting adequate light on any subject generally is an economy in manpower, but manpower is at a premium today and is liable to be still more so in the near future; therefore, almost any device that can be made to economize it should be tried out.

SOME INTERVIEWS

This One with a Mine Worker

Earlier in the day I had observed him walking down the street arm in arm with a young man clad in khaki, and upon inquiry I learned that the young man was his son, drafted by Uncle Sam, and proud of it. I assumed that he would be a willing contributor to the Y. M. C. A. fund, and in that I was not disappointed. Incidentally, he gave me many pointers about many of the camp's citizens, even going so far as to suggest how much I might expect from most of them.

"You see, I have been treasurer of our church for years," he said, "and I have generally found that the man who contributes liberally to the church gives a good account of himself whenever a call is made upon his generosity, be it for money or service."

This mention of "service" brought the conversation around to the draft law and its workings in the camp.

"Do you know," he said, "that every boy, with but one exception, who has been called to the colors from our camp has been accepted? Our super's boy was rejected because he couldn't pass the physical examination. Every one thought the 'old man' would be tickled to death when the news came back, but it has had just the opposite effect on him; in fact it has nearly killed him. He was not particularly anxious to have his boy become a soldier, but when he realized that his son was physically a weakling and made so poor a showing when competing with the sons of his neighbors, he decided that he had made a complete failure of his boy's training, and that in spite of the fact that he had given him such an inordinate amount of attention. The effect on the boy has been quite as pitiful."

This paved the way for questions that I had been longing to ask: "If you are such a patriotic lot," I ventured, "why is it that you ignore the Government's appeal for coal? Everywhere that I have been during the past few weeks I have heard such terrible things said about the conduct of the miners."

"You have asked a question that I cannot answer," he replied. "I have asked myself that same question any number of times during the past few weeks, but I can say this much with certainty," he continued. "A good many of our miners think it is more important to keep an upper hand over the operators than it is to whip the Kaiser." Then he quickly added, "Don't think that I am pro-German, for I am not; and don't think that I am in sympathy with the I. W. W."

"But you are in sympathy with 'a good many of the miners,' as you express it," I asked.

"Again you have asked me a question that I cannot answer," he replied. "Sometimes it looks to me as if the operators are trying to take advantage of Dr. Garfield, and then again I decide that our union officials are trying to do the same thing; and between these opinions I travel back and forth and get nowhere."

"Have you anything to suggest," I ventured, "to clear the atmosphere of all this suspicion and increase the output of coal?"

"Absolutely not," he replied, "although I'm ashamed to admit it."

Increased Coal Rates in Wisconsin

Following are examples of the maximum rates on coal allowed by the Wisconsin State Railroad Commission:

	Hard Coal		Soft Coal	
	Old	New	Old	New
Oshkosh	$0.75	$0.90	$0.65	$0.75
La Crosse	1.85	2.00	1.35	1.50
Eau Claire	1.40	1.55	1.00	1.15
Monroe	1.25	1.40	1.00	1.15
Janesville	1.20	1.30	Not decided	
Portage	1.25	1.38	1.00	1.10
Appleton	.75	.88	.65	.72
Chippewa Falls	1.40	1.55	1.00	1.15
Fond du Lac	.75	.90	.65	.75
Neenah	.75	.90	.65	.75

From Milwaukee to Wausau the hard-coal rate has been increased from $1.40 to $1.55; from Green Bay to Wausau the rate on the same coal has been allowed to remain at $1.40.

Where rates now in force are alike from Milwaukee, Sheboygan and Manitowoc to the same destination, the advance rates remain alike from each of such points to such destination.

Where the rates now in effect are 65c. and are alike from Milwaukee, Sheboygan and Manitowoc to the same place of destination, which point of destination is more than 30 miles from any one of said points of origin, the advance shall not exceed 10c. per ton. Where the rate from Green Bay to these same points is 65c., a like advance is also authorized from Green Bay. Rates from Green Bay on the Chicago & Northwestern road shall not exceed the following rates to the following points: To Little Rapids, 65c.; to Wrightstown and Little Chute, 67c.; to Kaukauna, 70c.; to Appleton, 72c.

IN LIGHTER VEIN

THE VIRILE SERIOCOMICOCCUS

It was recently developed in the course of a conversation that some of the younger coal chemists are of the opinion that the "Btu" was not originally in the coal, but rather is a form of *Seriocomicoccus*. This, they contend, was introduced into the coal mines, some years ago, through the agency of a salesman who, while badly infected with Btu, visited the mining region. The germ has never been satisfactorily isolated and little is known of its life habits other than that coal salesmen are often badly infected. Altogether the matter is in a clouded and unsatisfactory condition.

HE WAS BUSY

An Italian, having applied for citizenship, was being examined in the naturalization court.

"Who is the president of the United States?"

"Mr. Wils'."

"Who is the vice president?"

"Mr. Marsh'."

"If the president should die, who then would be president?"

"Mr. Marsh'."

"Could you be president?"

"No."

"Why?"

"Mister, you 'scuse, please. I very busy worka da mine."—*Exchange.*

Coal Mining Institute of America

The Coal Mining Institute of America, which holds its annual meeting on Dec. 5 and 6, at the Fort Pitt Hotel, Pittsburgh, Penn., has a more than usually attractive program for the celebration of its thirty-first birthday. On Dec. 5 there will be a business session and an election of officers. Judging from appearances, it would seem ill-advised to hold an election this year. Why not ask the old officers to serve again? The president's address will follow the election, though what he will be able to say now that he has no deficit to bemoan is hard to imagine.

The question box will be opened by W. E. Fohl. There is something not quite square about this question-box opening, for someone has already spread abroad the list of the problems submitted, and there is therefore no violation of secrecy in reprinting them. (1) What consideration should a state mine inspector give to the cost of improvements recommended in the interest of safety? (2) How far should Pennsylvania mine foremen be held responsible for the cost of production in view of the strict definition of his duties as found in the mine laws? (3) Why should the Associated Companies attach a penalty to the nonuse of carbide lamps in open-light mines? (4) Does private ownership of railroad cars facilitate the movement of coal?

Francis S. Peabody the Principal Speaker

In the afternoon the same eager flow of questions will continue: (5) What is the proper time of day for the blasting of coal; what precautions should be observed preliminary to blasting; by whom should the work be done? (6) Is the payment of bonuses to miners a satisfactory method of compensation? (7) What are the prime requisites of a satisfactory permanent stopping? (8) In pillar drawing, where are the greatest risks encountered—in high coal or in low coal? Under a strong roof or a weak roof? By splitting of ribs or by slabbing? (9) What conditions should determine whether mine cars should be retarded by brakes or by sprags? The institute dinner will have two addresses and two motion pictures. Francis S. Peabody, Chairman of the Committee on Coal Production of the United States Council of Defense and Assistant to the Director of the Bureau of Mines in charge of explosives, will be the principal speaker. Following him will be shown a series of films illustrating a trip through a modern byproduct coke plant. The plant will be described by C. J. Ramsburg, vice president of the H. Koppers Co., which specializes in the erection of byproduct plants. David W. Kuhn, fuel administrator of the Pittsburgh district, will address the meeting and E. E. Bach, who is sociological director of the Ellsworth Collieries Co., will show several of that company's wonderful underground motion pictures.

So much for Wednesday's program. On Thursday, D. A. Elkin, the president of the Elkin Engineering Co., of Bellaire, Ohio, will discuss "Coal Mining by Stripping," a matter in which Pennsylvania bituminous mines for obvious reasons have been outstripped by those of Ohio, Kansas and Illinois. George S. Rice, chief engineer of the Bureau of Mines, will read a paper on "Protecting Mine Roof with the Cement Gun." He will present the outcome of his experience with the gun at the Experimental Mine and the experience of operators through the country. B. M. Fast, of the Penn Public Service Co., of Clearfield, will show how the electric storage battery is proving of great service in meeting the low-coal problem in the Clearfield district. In the afternoon C. A. Llewellyn will describe "The Application of the New Revenue Act to the Coal Industry." As Mr. Llewellyn is United States Revenue Collector for the twenty-third district, which includes western Pennsylvania, he knows what problems are perplexing mining men in and around Pittsburgh. He is prepared to answer all questions. "A New Method of Drawing Ribs in the Pittsburgh District" will be presented by Joseph Bennett, the mine foreman at the Blaine mine of the Diamond Coal and Coke Co. This concludes the meeting. It is an excellent program, and the institute can well be congratulated on the excellent hands into which it has fallen.

Concrete Pillars in Coal Mines

The Lehigh and Wilkes-Barre Coal Co., of Wilkes-Barre, Penn., has designed a concrete pillar for use at points in the mine where more support is required than is afforded by the pillars of coal.

This concrete pillar is so designed that in case the roof of the heading or air-way should become weakened, it will not be necessary to use posts when timbering. It will readily be seen in the accompanying diagram that square holes 12 x 12 in. at the top of the pillar are

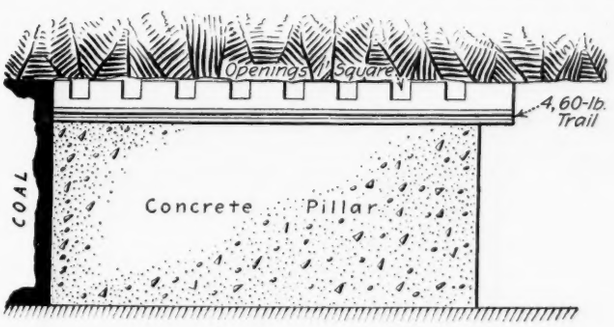


DIAGRAM OF CONCRETE PILLAR

left for the insertion of the cap pieces that it is sometimes necessary to place across headings. These holes are placed on 24-in. centers.

Where these concrete pillars come at a junction point, they are so designed that the upper 2 ft. extends out from the end of the pillar 2 ft., as shown in the diagram. In the lower 12 in. of this extension are embedded four pieces of 60-lb. tee rail. These rails run back into the main pillar a sufficient distance to give suitable bearing.

The extension is so designed that the concrete can be removed from the top and timbers placed on the tee rail, if this course of procedure is deemed necessary to support the roof.

In these times coal companies on their construction work prepare for contingencies. Under the old practice no provision would have been made to take care of the roof in case of trouble, but holes would have had to be cut by hand for the timbers or posts set up beside the concrete pillar.

[*Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Metropolitan Bank Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 703, Metropolitan Bank Building, Washington, D. C., while at the capital.—Editor.*]

Fuel Administration Puts in an Extremely Busy Week

While plans for pooling coal shipments on Eastern railroads and the discussion which terminated in the revocation of Priority Order No. 1 overshadowed other events of the week, there was, nevertheless, important action taken on other matters of far-reaching interest to the coal industry. The price of byproduct coke manufactured in New England was fixed; orders were issued whereby shipments of New England coal by water are given preference over all other shipments, except that requisitioned for railroad or Government use; Dr. Garfield laid down the law in a curt telegram referring to Michigan operators who are said to have refused to ship at the Government's price; Dr. Garfield took steps to prevent the closing of Oklahoma mines pending the settlement of an increased price to cover an increase in wages. These and other matters made for an extremely busy week at the Fuel Administration.

November Soft Coal Production May Break All Records

If the present rate of production is maintained, November will outstrip production achievements in any single month in the history of bituminous coal mining in the United States. The Geological Survey, in its weekly report, estimates production for the week ended Nov. 17 as having been 11,343,538 tons. This compares with a production of 11,300,890 tons during the week preceding and represents a gain of 2 per cent.

Beehive coke production, during the week ended Nov. 17, is estimated to have been 625,651 tons, as compared with a production of 615,432 tons during the preceding week. A decided increase in the shipments of anthracite was made during the week of Nov. 17, when 42,199 cars were forwarded. Shipments during the preceding week totaled 40,459 cars.

During the week ended Nov. 10, production was forced to 77.8 per cent. of the full-time capacity of the country's bituminous coal mines. Commenting on the limiting factors to production, C. E. Lesher, the Survey's statistical geologist, says:

In Illinois and Indiana car supply improved. The latter state experienced very favorable working conditions; losses because of car shortage amounted to only 6.6 per cent. of the present capacity as compared with 14.8 per cent. during the preceding week. The improvement in car supply in the three weeks ended Nov. 10 in central Pennsylvania is in striking contrast to the conditions in western Pennsylvania, where losses due to car shortage increased materially in the Irwin Gas, Freeport and Pittsburgh districts. Little change was reported from the Fairmont, Pocahontas, New River and southern West Virginia high volatile fields. The Cumberland-Piedmont field, usually well supplied with cars, reported a loss of 14.4 per cent. because of car shortage. Conditions in southwest Virginia and Alabama remained good, the favorable car supply apparently having the effect of keeping the labor supply stabilized.

New England To Be Assured of Its Coal Supply

With the Northwest insured of its coal supply, the Fuel Administration has taken steps to take ample care of New England. By utilizing the water route to the greatest extent possible, it is hoped to avoid a priority order covering rail shipments. To insure larger deliveries at New England ports, Dr. Garfield issued an order directing all mines with New England contracts to deliver their maximum monthly requirements, where such coal is to be transshipped from rail to water carriers at Hampton Roards and at Baltimore. These shipments are to be given preference over all shipments except those requisitioned for railroad or Government use. All mines holding New England contracts subject to the order are directed to advise the Fuel Administration within 10 days.

The order gives New England Fuel Administrator James . Storrow authority to supervise the distribution of the coal supply received by water after it reaches New England ports and provides:

In any case in which the New England fuel administrator is of opinion that by reason of this order an unduly large quantity of bituminous coal is being received by any person or corporation in the New England States as compared with the need for such kind of coal by one or more other persons or corporations in said states, said administrator may order that the party entitled to receive such excess of coal shall sell such quantity thereof to such persons or corporations as said administrator may designate, and at such price as represents the cost, as determined by said administrator, of such coal to such person or corporation from whom the same is thus diverted.

Garfield Lays Down the Law to Michigan Operators

When advised that some Michigan operators apparently expected to refuse to sell their coal at Government prices, Dr. Garfield sent the following telegram to W. K. Prudden, fuel administrator for Michigan: "If Michigan operators refuse to ship in accordance with prices fixed by you under my authority, I will take possession of mines. Serve notice to this effect, if necessary, prefacing same by statement that action is by order of the United States Fuel Administrator."

Prevents Closing of Oklahoma Mines

In reply to the Oklahoma operators' advices that they must have a price increase if wage demands were met, Dr. Garfield sent the following telegram to the Oklahoma Operators' Association:

Will not consent to change 45c. increase to cover increases of wages. If, as total result, you are unable to operate at a profit, the way to proceed is to file statements here showing your 1916 total costs, and costs for 1917 month by month, and meanwhile keep the mines in operation. Alternative will be to turn over mines to me for operation pending determination of costs. In other words, the only way in which the relation of increase of wages to increase allowed by President's orders in prices of coal can now be adjusted is by showing actual labor costs in conjunction with total costs as compared with earlier period above indicated. Under no circumstances must mines be closed down.

Price Fixed on New England Coke

In fixing the price of coke at byproduct ovens in New England, the Fuel Administrator took into consideration the increased costs of securing coal. The order reads as follows:

In making the order the Fuel Administrator established prices on byproduct coke produced in New England. New England coke producers will be permitted to charge prices that will cover their increased transportation charges on coal carried to New England by water for use in coke manufacture. The order fixes New England coke prices as follows: "For coke produced in New England, the maximum price for each grade, f.o.b. cars at point of production, shall be the base price for the grade of coke, plus the freight rate from the competing beehive coke district which takes the lowest freight rate to the point where the coke is produced, and plus 7c. for each advance of 5c. above 60c. in the freight charges per ton (2240 lb.) of coal for water transportation on the coal used in the manufacture of such coke. The base prices are as follows: Run of ovens, $6; selected foundry, $7; and crushed over 1-in. size, $6.50."

Regulations for New Coal Mines

The status of new coal mines was established for the first time Nov. 23, when the Fuel Administration issued the following regulations:

Operators owning or controlling a mine falling within this category may sell coal produced from said mine on orders or under contracts approved by the United States Fuel Administrator at cost, plus the profit specified in paragraph No. 6 below, and subject to the following provisions:

1. The quality of the coal produced and the mining conditions and equipment must be acceptable to the United States Fuel Administrator.
2. Deliveries of coal, whether on orders or under contract, may not be extended beyond Jan. 1, 1919.
3. Monthly cost statements shall be submitted to the United States Fuel Administrator in such detail as may be prescribed by him.
4. The only elements which shall enter into the cost shall be the actual cost of mining, transporting, hoisting and loading coal, to which shall be added only a fair proportion not to exceed one-half of the cost of mine management and maintenance.
5. Contracts for the sale of coal shall contain an express provision that the Government prices for coal f.o.b. mines, in the district in which said mine is located, may be substituted for the contract prices herein provided for, upon 30 days' notice to the parties concerned by the United States Fuel Administrator.
6. In addition to the costs provided for in paragraph No. 3 above, an amount may be added for profit on the following basis:

Fifteen cents per ton when the daily shipments are 250 tons or more. That is to say, until the daily shipments are 250 tons no amount is to be added for profit.

Transportation the Chief Problem

After pointing out how the Government's requirements are taking an important part of high-grade West Virginia coal and thereby making it necessary for central Pennsylvania to furnish the bulk of steam coal for New England, the National Coal Association points out that an inadequate car supply has reduced the tonnage to one-half of normal. In this connection, the formal statement issued by the Association says:

The tremendous amount of tonnage which the railroads are required to handle at the present time is so congesting the railroad yards and terminals, and overtaxing the motive power facilities, that it has been impossible for the railroads to handle expeditiously even the most vital necessities of the country, including fuel.

Unless some method can be found by which this congestion may be relieved without delay, there is no escape from the inevitable shutdown of street railways, electric-light plants, gas works and factories. The coal operators are ready and anxious to supply New England with the fuel it needs; a method by which this coal can be transported, however, must be devised.

Preferential Shipments to Northwest Now Ended

Priority Order No. 1 has been suspended, effective Nov. 30. This order, which gave preference to coal shipments consigned to the Northwest by way of the Great Lakes, is admitted to have inflicted some hardship in other sections of the country, but is held to have been remarkably successful in providing the Northwest with its fuel supply for the winter. Cars loaded at the mines on Nov. 30 will be given preferential movement until they arrive at their Lake port destination. The order was canceled a week or ten days earlier than had been intended after Dr. Garfield had conferred with F. C. Baird, who has represented the Fuel Administration in the matter of late shipments, and W. H. Grovermann, secretary of the Northwestern Coal Dock Operators' Association.

Laboratory equipment and machinery used in experimental work by the Bureau of Mines at Pittsburgh, which has been housed by the Carnegie Technical Institute, has been moved to the new building.

F. A. Meyers, fuel administrator for Maryland, has named a committee composed of R. E. Lee, Marshall, lawyer; Charles England, grain broker; Robert F. Roberts, packer; John H. Gildea, Jr., insurance, and Herbert Sheridan, traffic expert, as a state committee on fuel. The Baltimore committee is to be composed of Roberts, Gildea and Sheridan.

The Labor Situation

General Labor Situation

To a recorder of labor troubles, the absence of news is positively disconcerting. The mine worker and operator are now, if not in perfect harmony, at least both striving for the same great end—no less an end than the salvation of the country. Let us hope that this unanimity will continue all through the war.

The keynote of production is patriotism, and patriotism is not the private possession of either mine worker or operator. It is interesting to note how that patriotism has been successfully stimulated in Kansas City, where class antagonism was rampant. See note on the next page.

In the center of this page is a copy of "The Battle Cry," a publication to be sent monthly to all employees of the Davis Coal and Coke Co. That company, under the wise presidency of A. W. Calloway, and with the enterprising sociological efforts of C. L. Fay, has in recent years taken a lead in promoting the welfare and education of its mine workers.

On Nov. 22 the United States Fuel Administrator definitely accepted the new agreement in central Pennsylvania, and on Nov. 26 he approved the Illinois agreement. Both contracts contain penalty clauses satisfactory to the Administrator. The Illinois agreement was held up for some weeks for the adjustment of some minor details. The broad outlines were, as is well known, agreed upon several weeks ago. The agreement has been signed by H. C. Adams for the operators and by Frank Farrington for the mine workers.

In several parts of the country complaints are coming in that the local merchants are trying to absorb the mine workers' increases by increased prices for commodities. Something was said regarding this matter last week in reference to Illinois.

Now a detailed report on the condition comes in from West Virginia. The "dollar patriots" of that state are said to have raised the price of flour from $16 to $20.80 a barrel, beans from 20c. to 25c. a pound, canned corn proportionately, canned tomatoes from 20c. to 25c. a can, butter from 55c. to 65c. a pound, brooms from 85c. to $1.25 a piece, and sweet potatoes from 60c. to 90c. a peck. At a mass meeting of representatives of the mine workers of District 17, resolutions were adopted calling on Food Commissioner Hoover to correct the situation.

The American Federation of Labor reëlected Samuel Gompers as president by an almost unanimous vote; of nearly 600 votes only two were cast against him.

THE BATTLE CRY

Published monthly by The Davis Coal and Coke Company in the interest of its employes for the cause of Freedom and Democracy

Vol. 1 NOVEMBER, 1917 No. 1

We are up against the tremendous FACT of a terrible WAR. You cannot get around or under or over a FACT. You have to MEET it.

Our Company's officials and employes together form one unit of the "Home Forces" working to help WIN THE WAR.

We believe it to be the patriotic DUTY of each individual to "do his bit." And we believe it to be the DUTY of every business or industrial organization to work together as a UNIT to help WIN THE WAR.

This publication aims to stimulate patriotic service by every member of the D. C. AND C. UNIT.

We are producing coal for our government to HELP WIN THE WAR.

We are a volunteer regiment in the Home Service Army. We serve together as the D. C. AND C. UNIT. Our battle cry is: "OUR COAL WILL HELP PUT THE CRIMP IN KAISER BILL!"

Rounding-up Disloyal Miners

The disloyal mine workers are so few that it should be an easy matter to round them up with the aid of the large body of thoroughly patriotic mining men, with whom copperheads have no standing. It must be confessed that there were a few men at first who believed they could strike and work slackly without doing much harm. The number of days they were kept idle waiting for railroad cars made them think that the nation did not really need their services. They are now becoming convinced that the fate of the nation rests on their endeavors and, being good citizens, they will not let their country fail for any remissness of theirs, and they will have nothing to do with men who for money or alien sympathy are trying to wean them from their duty.

It will be remembered that the recent Illinois strike was brought to an end by Frank Farrington, the state president of the United Mine Workers, who threatened to expel the strikers from the union and cancel the charters of the striking local unions.

It was announced at that time that a searching investigation would be made and that the agitators who caused the strike, which was harmful both to the organization and the country, would be hunted down, driven out of the organization and prosecuted.

In the arrest at Chester, Ill., of William A. Moore, by order of United States District Attorney Charles A. Karch, of East St. Louis, it is believed that a step has been taken toward the fulfillment of this promise. Moore is alleged to be a member of an organized band within the United Mine Workers which band is said to have led the strike. Government agents believe that through Moore they will be able to cause the arrest of several other leaders. Moore's arrest followed an investigation at Coulterville, Ill., and in several other places where Moore is said to have been active in inducing the miners to strike. He is said to have admitted that he was a member of the Industrial Workers of the World and that he had attempted to stir up dissatisfaction in several localities. He is also said to have made disloyal remarks about the Government. Moore will be given a preliminary hearing before United States Commissioner Fox at Murphysboro.

Farrington declares that the strike was the result of a pro-German plot and that the same influences are now trying to defeat him for reëlection, so as to punish him for ordering the men back to work. The plotters, he says, contemplate getting control of the mine workers of the country. He says

he does not expect further wage troubles, but he thinks that efforts will be made to spread discontent among the mine workers on other scores. "I am for the miners," he said, "and want them to get all they deserve or can graciously get, but I am for the United States at the same time, and if I can help it I will not allow a few irresponsible men to be influenced by national enemies or permit them to resort to actions that will not only embarrass the Government in its efforts to win the war, but also embarrass the rank and file of the patriotic and loyal mine workers of Illinois."

Springfield Local Declares Principles

The change in heart in Illinois is shown by the action of the Springfield local. Its wholehearted defense of patriotism and loyalty to contracts the public will do well to remember.

A petition is being circulated calling for a special convention to rebuke the representatives of the union for signing the Washington agreement with its penalty clause. The union officials are charged with assuming authority that did not belong to them. If they could not make a contract it is claimed that they could not amend it even though every amendment was favorable to the mine worker and added to his emoluments.

The Springfield local opposes this petition and its resolution says: "We believe that the cardinal principle of our organization, or of any other organization, is its faithful observance of contracts. By living up to these principles we prove to the public and to the unorganized miners of this country that the collective method of making joint agreements which the United Mine Workers have had in operation in Illinois for 20 years is the only sane, sensible and equitable method of conducting this great business, a business on which this country's welfare depends."

The state and national officers are then commended for what they have done and the mine workers are urged to stand together in support of the contracts made.

Explains Relation of Wage to Cost

Samuel D. Warriner, chairman of the anthracite coal operators' general committee, and a member of the National Fuel Commission, has issued the following statement:

Most important to the public interest at this time and essential to the conduct of the war is an adequate fuel supply. At present there is not sufficient coal, either anthracite or bituminous, to meet current needs. The demand is everywhere urgent. So is the demand for labor, and it is making for higher wages.

The national situation has pressed upon the anthracite industry. Negotiations were concluded last week between the mine workers and the operators, covering a proposed further modification of the agreement which was made in 1916 to run for four years. Another advance in wages has been agreed to, subject to certain conditions to be approved by the Federal Fuel Administrator. It will be in addition to the increase made last April.

We believe that the present wage advance is fair and justified by the conditions surrounding labor. Moreover, we know that it is necessary to hold labor in the anthracite region. The normal number of men was 175,000. It has now been drawn down to 150,000. The men are going to industries which offer higher wages.

It is a condition, not a theory, which the anthracite industry now faces. Production has been kept up and actually increased partly through steadier work, but largely by the introduction of machinery.

The wage increases agreed upon are essential to enable the producing companies to expand their production, and are as follows: On daily wages, 54 to 64c. for men and 30c. for boys, and 15 per cent. increase in the contract rates to miners.

Such increases figure about 45c. a ton on all marketable coal, including the steam sizes. Under the agreement now before Dr. Garfield for approval, such additional cost is to be added to selling prices.

Costs differ in different mines, according to physical and other conditions. The 45c. a ton will not meet the larger wage cost in mines producing about one-quarter of the anthracite tonnage. It will a little more than meet it as to the balance. It is impossible to maintain a differential in the price of one and the same commodity. The effect of the revision as to the lower-cost operations will be to stimulate them to larger production. That will help meet the great demand for more coal.

Wages constitute 65 to 70 per cent. of the cost of producing anthracite. Supplies and other items make up the balance. The retail price should not be increased any more than 45c. a ton, which is the advance in price sought by the producer. Government figures show that the wholesale price of chestnut, the size of anthracite in most favor for domestic use, was only 17 per cent. higher in August than it was three years before. In the same period prices of other commodities increased from 20 to 300 per cent.

The anthracite industry is striving to perform its full part in the present emergency. It is working under the difficulties and added costs which are experienced on all sides. It has no special control over labor and wages. The public weal calls for fullest operation of the mines. The operators find it necessary to pay higher wages to the workers that the public shall have coal, and they stipulate that only the extra wage cost shall be added to the price.

Patriotism Imbues Southwest Miners

Coal operators and dealers who have come into personal touch with some of the important work being done by the Government in connection with the coal industry are convinced that the right course will be taken by the authorities.

"The Government was so long getting started on some of this work," said one operator, "that we had rather lost faith that anything would be done. But we have to hand it to 'Uncle Sam.' When he gets busy, he does the job up right."

This operator was referring particularly to the labor situation and the manner in which the Government was going after the Industrial Workers of the World and the Working Class Union. It is known that more than 100 I. W. W.'s have been arrested in the Kansas oil fields, and it is certain that many agitators in the coal fields of Kansas and Oklahoma have also been arrested.

Kansas City has been freer of labor disturbances during the past month than for a long period of time. Credit for this is given not only to the Government, but to a series of statements by employers, published in display space in the newspapers. Business men told in this space the facts as to the agitations for strikes, showing that the workmen in many plants that had been picketed were actually well content, and drawing better wages than were provided in the scale for which they were to be called out. The statements also indicated that outside influences were being exerted on Kansas City workmen to cause disaffection. The result of the published statements—paid for in advertising display space—was a change in public sentiment with reference to the labor troubles and a subsidence of the agitations. All the strikes were amicably settled—and in every case without recognition of the unions. The respite from agitation in Kansas City has had an effect on the entire territory, where Kansas City newspapers circulate extensively.

More Trouble with Superlatives

On July 7 this department said, "Washington Pays the Highest Wage." On Sept. 15 an article appeared in it headed, "Oregon Corrects a Superlative." Fate still pursues. Under date line, "Eska Creek Coal Mine Via Anchorage, Alaska, Sept. 23," our friend Sumner S. Smith, resident mining engineer, Alaska Engineering Commission, writes:

"We do not pretend to say that we pay the highest wages of any of the coal-mining districts, but we are certainly paying considerably more than the State of Washington, as shown by the following scale:

Miners and timbermen	$5.25 per day
All underground laborers	4.75 per day
Common outside laborers.....	4.00 per day

"All of this is for an eight-hour shift, and overtime is paid for at the rate of time and a half. Board and quarters in the bunkhouse cost $1.25 per day."

Our readers will note the date line. Today common outside laborers in prosaic Pennsylvania and elsewhere are getting $5 a day instead of $4, so fast does the wage scale mount and the burden of the consumer augment.

Editorials

THIS year we are asked to produce for ourselves and our allies products worth twenty billions of dollars, which we never in our history produced before. Let us leave the money cost of these articles out of all consideration except as a means of totaling the aggregate of service that we must render. Let us suppose we have all the money we desire and so do not lack for that commodity, yet we will still be face to face with the fact that we need that twenty billions of product. It can only be obtained by working more and by consuming less.

* * *

We discuss the problem as if it were merely a matter of money, but perhaps the idea may be best conveyed by an analogy. When a suit doesn't fit it doesn't fit. If the trousers only reach from the waist to the knees, it does not do the tailor any good to tell us that he used enough cloth and therefore that the pantaloons are a perfect fit; for we know they are not. Similarly, the United States may have wealth galore, but if it is not rightly disposed it will not serve to fill the national and international need.

* * *

If we do not have the material to wage the war it is useless to say, as some do, that there is wealth enough in the country. The material we need is not and cannot be here unless we do more for the supreme purpose and expend less on those objects that are less needful. We can wage the battles of this war only with tools planned and forged solely to fill that special purpose.

* * *

We have heard them all, those that said we will strike our blow with the energy derived from the past and those who said we will borrow energy from the future. Let us arrive at the conclusion that the fight we wage will be won by the labor, the energy, the wealth created in the present—by our people, not by our ancestors or our children; by the living, not by the dead in our cemeteries or the posterity yet unborn.

* * *

NO ONE can object to passing the stress onto the generations to come if it can be done. But when we realize that the work to be done must be done now, what is the advantage in declaring that we propose to leave it to future generations? Equally is it absurd to say when we want shells and aëroplanes: "Here is a brownstone building, I will use that instead." Clearly the war must be waged with what we make while the war lasts. The past has been spent in making materials which are no help in war. The future has, of course, done nothing for us. So we are thrown on our resources. We must therefore expend all our energies on the war, and most of the energy hitherto expended for our bodily comfort must be converted to war work. Unfortunately, most of us have not yet begun to save, and few of us are producing any more than before.

"The men about to die salute you." Are you prepared to let them make all the sacrifices, while you at home make none? Is it necessary to cover your slacker body with khaki to make you realize that you are under orders, rationed by Hoover, directed in your work by Garfield and allowed a soldier's pay by Congress and McAdoo, the major generals of our industrial army? Do you need a uniform or is a brassard enough to remind you that he who digs coal, he who hauls it, he who loads it on a car or on a ship is in the army and must comport himself as a soldier in the service of his country?

* * *

Clothes too often make the man. If tomorrow we were to put on a uniform, and morning, noon and night salute the flag like soldiers, we might with these aids remember our country and our country's needs. But so long as we are beguiled with nonsense to the effect that our grandfather made shells for us, and our grandchildren have wrought howitzers for us to fight with, we shall have only fictitious shells to fire from visionary cannon.

* * *

SOME of the allies have fought, it is true, with the energy derived from their children. They have borrowed money from us and from the British which their children will repay. But we have no one to borrow from. Like the British we shall soon come to the point where we can lend to foreign nations no longer, because we are unable to borrow in large enough quantities. Only the second Liberty Loan has been floated, and already the indubitable promises to pay of the greatest of nations have fallen to between 97 and 98 per cent. of par.

* * *

We shall soon realize that we are at a point where higher interest will not secure wealth, because it will be plain that there is none available except what little can be obtained just about as well at a lower rate of interest. The wealth being created will then be recognized as all the wealth that can be obtained, and it will be seen to be absurd to scrape the well for water which is not there. We shall have then to wait patiently, as the British do, for more water to seep in.

* * *

It is just as well to see this early as to see it late. It is just as well to cease being prodigal before the pinch comes than to wait on poverty to create prudence. Let us therefore firmly resolve to save now, for we cannot grind with the water that is past, nor can we turn our mills with the water from rain that has not yet fallen on the slopes of the hills. Neither the past nor the future is waiting on us; we have only the present. What we do in that present will be to our posterity either their glory or their shame.

The Davis Coal and Coke Co., in its *Employee's Magazine*, quotes a poem by A. B. Stewart which we cannot avoid quoting. It is entitled "The Home Service":

I want to compare with the men at the front,
With the men who have gone to fight,
With the men who have given up home and all,
In the cause of freedom and right.

I want to work, though I cannot go,
With the spirit they have over there,
I want to feel I am doing my part,
At least that I'm playing fair.

I want to give up what they give up,
Do I need what is not their joys?
The pleasures that were for the duties that are,
Let me work and be one of the boys.

* * *

What will go on at the front will be a reflection of what we do here at the rear. Let us hope the record will be creditable to us. No one doubts the devotion and ability of our soldier boys, but even the most patriotic and cock-sure among us are wondering how faithful our civilians will be during this time of stress, when service should be universal and sacrifice should be general.

Choose Your Own Nonessentials

THE Fuel Administrator has announced that certain trades will be declared nonessential, and coal will be refused them. In this he is fully justified by the coal shortage, the existence of which is now unquestioned; but as far as possible the coal miners should try and retain that selection in their own hands by so largely increasing the output of coal that action toward the closing down of nonessential industries by the Fuel Administrator will either be unnecessary, delayed or made less stringent.

Those men who refuse to do their part may find many of their comforts considerably restricted. It is true, restriction of the manufacture of nonessentials may occur in any event as a general war measure, but the mine workers by putting out a large output of coal can make it less necessary for the Fuel Administrator to put his plan in operation or may justify him in making it less drastic.

If the restrictions we must all make are of our own choosing, the war will be made less unkindly to us civilians. If we are permitted to choose our sacrifices, we shall be better able to keep up our spirits. The more we do to put out a large tonnage of coal the less likely it will be that we shall be prohibited from enjoying some of our pet pleasures and hobbies.

Will the Coal Shortage Continue?

THE duration of the coal shortage depends on several factors. One of the chief of these is the amount of that shortage. It has been estimated by the Fuel Administrator at 50 million tons. As he has been disposed to deny that there was any coal shortage whatever, probably the figure is within the mark, but it is a comforting assurance to remember that it represents only about one-thirteenth of the present year's production or, as a percentage, 7½ per cent. of the present annual output, which is figured at 650 million tons. This percentage, it will be seen, is quite small; and there are still a few inefficiencies which amended should help to cure conditions, though somewhat late.

It must be remembered that the shortage is not in the future, but is immediate. It is interesting to compare that shortage with a year's output, but then we can belittle it still more by comparing it with the tonnage of a whole decade; and we might make it look big by comparing it with the tonnage of a single month. After all, perhaps that is the more correct norm for the measuring of this abnormality, for we probably have little more than a month in which to rectify a condition that has been growing on us.

There is no reason to believe that a year's output should be taken as a basis of comparison. The shortage of 7½ per cent. becomes 90 per cent. as soon as you shorten up the time of comparison to a single month. Far from being a matter for indifference it becomes a matter for apprehension and drastic treatment. Especially is this true as the winter is coming on and the movement of cars is delayed.

However, there are some causes for hope. The priority rights of coal, especially in regard to open-top cars, is one of the reasons for being hopeful, and the prospect that some nonessential industries will be cut off promise some further alleviation of congestion. Then again, the favor shown to the Northwest, including Canada, was a preference shown to long-haul traffic as against home traffic. As a result the cars, while registering more ton-miles, carried fewer tons and returned less often to the mines than they will after Nov. 30, when the priority order in favor of the Northwest is revoked. Of course, the Northwest now has a lot of these cars, about 14,000 alone have been removed from the Pennsylvania system. When they return to short-haul service and perhaps do not haul beyond the confines of a single state, they will have an efficiency much greater than has been exhibited while traveling semi-continental distances.

The pooling of the railroads and the pooling of coal may assist in solving the problem. Greater and more regular activity on the part of the mine workers will also help. The mines could do 25 per cent. more if the present force worked every day and 40 or 50 per cent. more if they would work a full 8-hour period. The railroads may be able with the new arrangements to take proper care of that larger output.

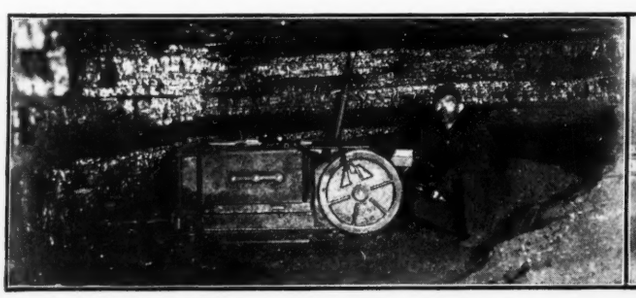
But we shall not do well to expect too much from pooling, short hauls and embargoes. What we need is railroad coal cars, and till we get them we shall be uncertain as to the outcome. And we cannot get cars unless we advance the necessary money to the railroads.

There will probably be no labor difficulties to complicate the situation. In the immediate past when strikes have been of long duration they have not caused a decrease in production proportionate to the length of the time during which the mines were idle. The cars for the idle mines are transferred by the railroads to points where the mines are working. Especially will this be true under the better railroad coöperation, but sporadic strikes and strikes of short duration do not make it possible for the railroads to place cars where they are needed and cause much waste motion. Hence it is most gratifying that peace is at length secured, and that the mine workers are now as a whole coöperating in the plan to organize the nation for the war.

Snapshots in Coal Mining

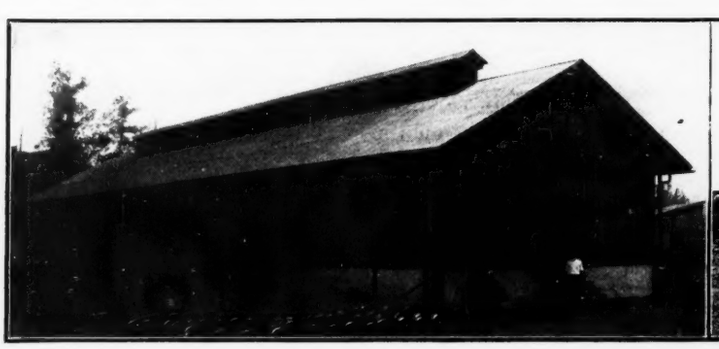
RUINS OF MINE, SANS-EN-GOHELLE, FRANCE

WRECK OF MINE CARS



SHORTWALL MINING MACHINE AT SAYRE MINES, SLOSS-SHEFFIELD STEEL AND IRON CO., SAYRE, ALA.

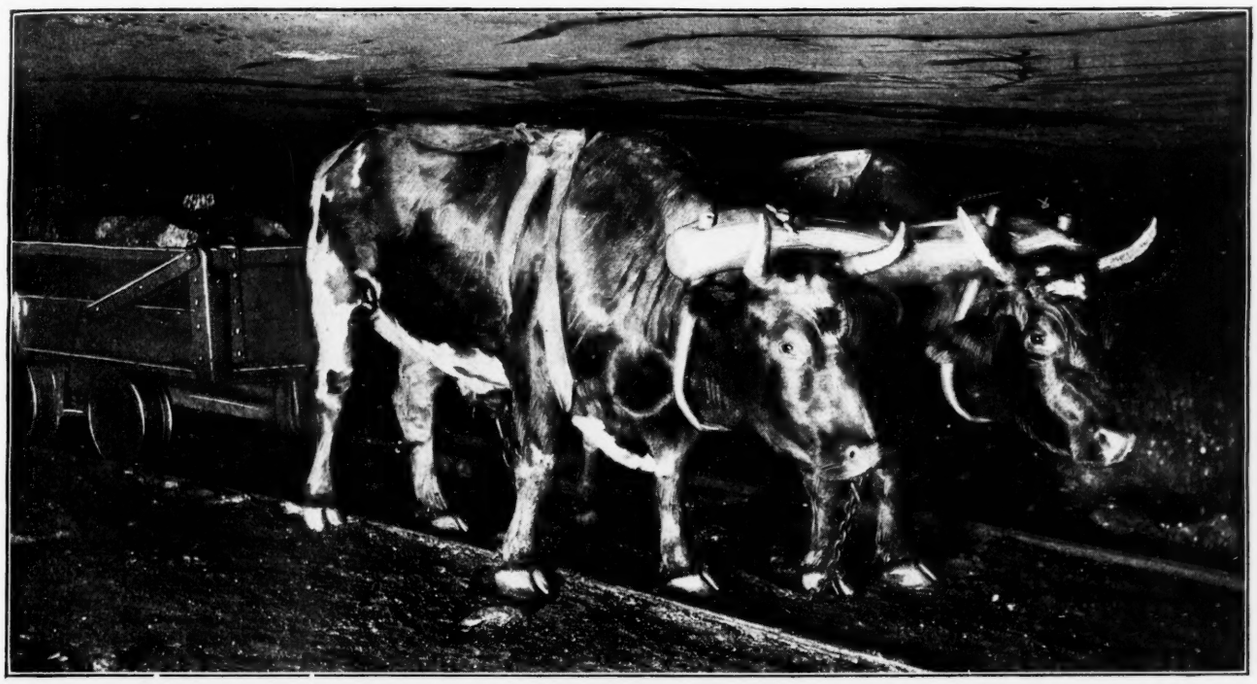
BEEHIVE COKE OVENS OF THE SLOSS-SHEFFIELD STEEL AND IRON CO. AT BROOKSIDE, ALA.



STABLE OF THE SLOSS-SHEFFIELD STEEL AND IRON CO. AT FLAT TOP, ALA.

STABLE AND LOT AT THE SLOSS MINES OF THE SLOSS-SHEFFIELD STEEL AND IRON CO.

CHILDREN'S PLAYGROUND AT THE SLOSS MINES OF THE SLOSS-SHEFFIELD STEEL AND IRON CO.



HAULAGE IN THE LONG AGO, WHEN COAL WAS BROUGHT TO THE SURFACE IN BUSHEL BASKETS

The evolution of haulage in coal mining is excellently illustrated by comparing the present up-to-date systems in first-class mines with the method depicted in the photograph. In England and in this country also in the early days of coal mining, the miners pushed their coal to the bottom of the shaft; after that dogs were used in many cases, but the employment of steers in this capacity was unusual

VIEW OF A BOILER ROOM OF W. J. RAINEY, OF UNIONTOWN, PENNSYLVANIA

Discussion by Readers

Convict Labor in Mines

Letter No. 2—I fail to see how any mine foreman or other official could advocate, for a moment, the employment of convict labor in our coal mines, in competition with miners who depend on the industry for their living.

The letter of C. M. Young, *Coal Age*, Oct. 20, p. 692, gives many interesting facts in regard to the employment of this class of labor in mines operated by the Government in certain states, the purpose being to better the condition of this unfortunate class of beings and to prepare them for engaging in some profitable employment when released from prison.

In respect to the coal-mining industry, the problem presents varied and conflicting aspects. As Mr. Young has stated, "Most prisoners are not trained, nor are they highly intelligent." As a result, few of these men are fitted to mine coal with advantage to themselves or a company, and it certainly would not be right to employ convict labor in competition with miners regularly employed in the mines.

There is one aspect of the case, however, that is of particular interest at the present time. It would seem that this class of labor could be utilized to make good the shortage of miners and maintain the supply of fuel, which is the important factor in enabling this country to win the war.

Far be it from me, however, to advocate making our mines convict-labor mines. My belief is that many of these men could be sought out in the prisons and given the opportunity to enter some employment that would benefit and fit them for a useful life, while proving of equal advantage to the country. R. W. LIGHTBURN.

West Leisenring, Penn.

Miners and the War

Letter No. 2—After being associated with the mining industry for a period of 22 years, either as a miner, engineer or operator, it naturally devolves upon one who has had the privilege of sitting in the councils of the United Mine Workers of America, to wonder what the attitude of the organization is toward the increased production of coal, and whether their motives are patriotic and void of a selfish purpose.

Recently, we observed that, throughout the various mining centers, the operators and representatives of organized labor met in joint conference and pledged their support to the Government. In the light of developments, it is proper to ask, What is the result of these patriotic pledges?

At the present time, we find that the mines in many districts are striking for higher wages and abrogating contracts just made by their representatives. What is the solution for so much industrial unrest? Is the trouble due to the various heads of the organization not having control over the membership?

Frequently, we see that mines have been closed on a strike order given by local officials. These orders, in a measure, defy the power of the district officials and, so far, we appear to have no remedy for this breach of contract. The articles of agreement defining the rights of locals require that a suspension or strike order must be authorized by the national officials, but the penalty of revoking the charter of a local does not relieve the present situation.

Revoking the charter of a local having a membership of 500 men would not break the strike curtailing the production of a large sized mine capable of putting out from 3000 to 4000 tons of coal per day. When these men strike and refuse to work in the mine for a period of 10 days, which is nothing out of the ordinary, it is clear there must result much loss to the country.

Problem Confronting the Miners' Organization

Accepting the fact that the United Mine Workers of America is the largest and strongest organization of its kind in existence, we readily appreciate the position of its executive officers. It is said that the organization serves as a melting pot for the future American citizenship of our alien mining population. If this is the case let me ask, Is the executive head of the organization able, at this time, to fuse this heterogeneous mass of opinions into one thought—that of serving their adopted country? Past and present events convince me that the executive officers have not much influence with the rank and file of the organization during this critical period.

Only recently, we observed articles given to the press by the executive officers of the Southwest, wherein much discussion was devoted to the "high cost of living and the working conditions of the miners." The only points of difference in the negotiations between the miners and operators are the increase in wages and the so-called penalty clause. Without the penalty clause, as a measure of protection, to safeguard the operations against suspensions, walk-outs and strikes, what guarantee of good faith can the organization substitute for the "penalty clause"?

When the penalty clause was first introduced there was considerable agitation, among the more radical of the membership, against any action being taken that would restrict the power of the organization to strike. It was said that the only power a body of organized workmen possessed to exact conditions and tribute from the operators, in its own defense, was the strike order. If this organization is allowed to exercise the privilege of striking on the slightest pretext, without either consulting the National Fuel Board or the public at large, the coal industry, instead of being operated to its maximum efficiency, will experience an intolerable state of affairs.

It is generally conceded that the present raise granted the men is not going to satisfy the mine workers. The

reason lies, apparently, in the ulterior motives of the socialist element; namely, that if the operators refuse to comply with their future demands, the Government will confiscate all mines and mining property, and operate them for the public at large, eliminating the mine operator and giving the profits to the workman.

If Federal control proves to be the only solution of curbing agitators of labor, I dare say that the Government will not long tolerate any interference from these professional walking delegates; neither will the Government hesitate to conscript labor as a means of exacting the highest rate of efficiency from all mine workers.

McAlester, Okla. OBSERVER.

Treatment Accorded Miners

Letter No. 3—The source of most of the troubles that arise from the handling of men, in coal mining or any other industry, is the treatment they receive at the hands of the mine officials in charge. For some time past, many miners have been induced to leave the mine for work in factories where they have been promised higher wages than they could earn underground. This, together with the decrease of immigration and the draft of men for the war, has made labor scarce in many mining districts and rendered it more important than ever to hold the men now employed in the mines.

My theory has always been, Treat men right and they will not be so quick to move. There will, of course, always be some dissatisfied ones, which makes it necessary that a foreman should exercise the utmost care in hiring his men. A foreman who hires every man that comes along looking for a job because he needs men will have no end of trouble. Look into a man's record as far as this is possible. Ask him where he has worked; how long, and why he left. It is safe to say that a man who is frequently changing from place to place has an habitual grouch and brings trouble with him wherever he goes.

Perplexities of the Mine Foreman

A common source of annoyance to a good foreman is the slow progress made by the men engaged in certain work. Here is opportunity for trouble, especially if the foreman is not a good judge of what constitutes a day's work. He may not realize and, perhaps, the men fail to explain the particular condition that has caused the delay. At such a time the wise foreman will use his best judgment and exercise patience in dealing with his men. It is not well to accuse them of being slow, unless such is truly the case.

Again, in order to expedite work, it may frequently be necessary to change men about, placing them where they can do better, and putting men in their place who are more familiar with the work. It is far better, when making such changes, to do so quietly, without offering unnecessary criticism of the work performed, as that will only arouse a dissatisfied feeling in a man. Instead, tell him you have a job you want him to do, and give him to understand that he is the man who can do it. By this means, the man is animated to do his best instead of being discouraged with the thought that he has failed to give satisfaction.

It is well known that every foreman has his own trials. He is often blamed for what is not his fault, but for his own sake he must overlook this injustice and not permit himself to pass it on to his men. Success depends on his maintaining a pleasant and kind disposition toward those working for him. Call the men by name. Smile when you greet them in the morning, remembering that men will do more work for a cheerful boss than for one who has a frown.

A Cordial "Good Morning, John," Animates the Worker

Suppose a man comes late when it is not his habit to be tardy. There must be a cause, which he could explain with satisfaction if given an opportunity. It is not necessary to go over him for what was probably unavoidable on his part. A hearty "Good morning, John," will put him in a mood for work at once, and the chances are that he will accomplish more in that day than if he had been on hand when the whistle blew. The cheerful greetings of a foreman produce more work, increase the output and reduce the cost-sheet for the day to a greater extent than anything else.

In the management of a mine all men must be treated with equal fairness. A "square deal" is a powerful factor in keeping men satisfied. When a man is in line for promotion, nothing is more discouraging to him than to see another given the consideration that should have been his, without the matter being explained to his satisfaction. Such treatment of an honest, faithful worker sows the seeds of dissatisfaction, and trouble and loss to the company will follow sooner or later when a foreman acts on that principle. From the doorboy up every employee should be given the same opportunity for advancement, according to his capability. In that way only can a foreman gain and hold the confidence of his men. JOSEPH R. THOMAS.

Plymouth, Penn.

Letter No. 4—I was deeply impressed with a letter that appeared in *Coal Age*, some time ago, in which reference was made to the foreign-speaking miner, especially the Hungarian miner. What the writer said recalled to my mind an incident that occurred a few years back when I was timekeeper for a large coal company.

My duties required me to leave home at an early hour in the morning. At that time I was living with my aged mother and it was my custom to spend a few minutes talking with her before going to work. One day I went to the mine as usual, but was later called home by a messenger, only to find that my mother had passed beyond the reach of my voice. The following day a brief letter came to me from the foreman, expressing his sympathy and offering me any needed help. We are all better for a kind word spoken in season, and I have always treasured this letter from the boss.

Kindliness and Sympathy for the Foreigner

In company with many others about the mine, I have never tried to gain the viewpoint of the foreigner among us. In some cases, as was stated in the letter to which I have referred, the foreigner is given preference over the American miner, because of conditions that make him willing to work for less wages. Too often we have come to feel that he is robbing us of our rights as Americans. With this animosity in our minds, it is easy to forget to be kind; and the position of the foreigner becomes an isolated one.

More or less of the same spirit is displayed by the officials of large coal companies toward all mine workers, American and foreign-born alike. When a man is killed in the mine, it often happens that his family does not receive the expression of sympathy from the mine officials that it should be their right to expect. To the great corporation who employed him, the man injured or killed by accident in the mine was but one of a thousand other workers, and the fact is ignored that he was the breadwinner and sole dependency of a family who now face a condition that calls for both sympathy and help.

At times, the lifeless body of the breadwinner has been carried home to his family without a word of warning having been sent to prepare them for the shock. Is it visionary or impracticable to suggest that, at such a time, a few kind words spoken by those in authority would greatly help to lessen the heartache that the accident brings to the home?

It is good to know that the world is growing better every day, and the coal-mining industry is no exception to the rule. Mine workers, from the higher officials to the humblest employee, are learning lessons that are old as the hills and yet new to many. In the present war crisis we are placing much emphasis on the value of loyalty to our country, and, incidentally, the lesson of loyalty to our fellows is brought home to all. Let us remember that the craving for sympathy has no racial distinction, but applies alike to all miners whether American or foreign-born.

J. KENVIN.

Minersville, Penn.

Supporting Excavations in Drift

Letter No. 1—In connection with the discussion in *Coal Age*, some time since, in regard to sinking a shaft that was to be concreted for the first 40 ft. of depth below the surface, permit me to describe briefly my method of supporting the sides of the excavation to this depth, previous to building the concrete lining.

Experience has taught me that it is cheaper to provide ample support for the loose material overlying the hard rock formation. The best practice, today, is to line the shaft from top to bottom with sufficient timbers both to give the needed support to cage guides, steam and water pipes and electric cables, and prevent possible injury from the falling of spalls, which are liable to drop from the rocky sides when exposed to the heat of steam pipes and the action of air, moisture and frost.

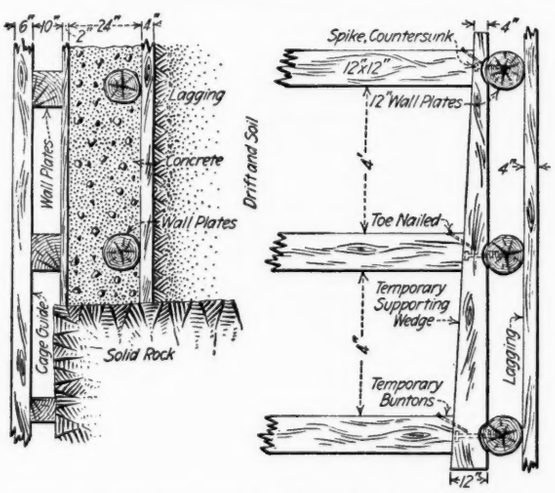
The first step is to determine on the desired inside dimensions of the shaft compartments and to add to these dimensions the thickness of lagging, wall plates and other supporting timbers, making due allowance for the thickness of the concrete lining. This must be sufficient to give substantial support to the strata, under the severe conditions to which they are exposed from the vibration and pounding incident to the hoisting and dumping of coal on the tipple.

Having determined the full size of the excavation, the work is started and carried to a depth of 5 or 10 ft., depending on the nature of the soil. Digging is then stopped temporarily to allow of the setting of the logs or wall plates required to support the lagging on the sides and ends of the excavation.

On the right of the accompanying figure I have shown a sectional elevation to illustrate the manner of temporarily supporting the heavy wall plates that hold in place the 4-in. lagging supporting the loose material that constitutes the drift overlying the solid rock. These wall plates are heavy logs forming a horizontal frame surrounding the excavation and spaced about 4 ft. apart.

As shown in the sketch, the wall plates are supported temporarily by a wedge-shaped timber 10 or 12 ft. in length. Shallow notches are cut with the adz on the back side of this wedge, at points corresponding to the positions of the wall plates, which affords sufficient support to hold them in place. Cross-buntons 12 x 12 in. in size are used to hold the wedges firmly aganst the wall plates. This construction is duplicated each 10 or 12 ft. in depth, until the solid rock formation is reached. The temporary timbers form a substantial support for the wall plates and the lagging supporting the loose drift material.

When the excavation has reached the solid rock, the building of the concrete lining is started at that point



DETAILS OF SINKING THROUGH DRIFT STRATA

and continued upward to the surface. As shown on the left of the figure, the concrete is filled into the space surrounding the wall plates just mentioned. The outer surface of the concrete lining is formed by a lagging of 2-in. planks, which are supported by other wall plates made of 10 x 10 square timber. These wall plates serve, also, as supports for the cage guides.

In speaking of the concrete lining, a former writer mentioned a thickness of 6 in. as being sufficient for the support of the loose material to a depth of 40 ft. below the surface. Allow me to say that, in my opinion, this is false economy. It must be remembered that the whole life and soul of the mine depends on the shaft supports. No greater mistake could be made than to adopt too thin a lining, which will yield and bulge under the pressure to which it is subjected, and cause no end of trouble and expense. In this instance, I would use not less than 2 ft. of concrete and increase this to 3 ft. when within 10 ft. of the surface, so as to provide a more substantial support for the headframe, very much after the manner illustrated in *Coal Age*, Aug. 25, p. 335.

An important point to be observed in sinking a shaft is to carry the concrete wall and permanent timbers up

a sufficient height above the original surface of the ground to provide good drainage away from the shaft. This will also serve to prevent cars running into the shaft when left standing on the surface. In my experience I have found this a most important provision and one that should never be neglected.

All pipe lines and electrical conductors should be taken down a separate compartment. In some cases I have found it convenient to form such a compartment by spiking diagonal braces across one corner of the shaft. A ladder can be spiked to the inner side of these braces so as to make it easy to reach the pipe lines at any point. Another plan is to take the pipe lines and conductors down one end of the manway compartment.

Wheeling W. Va. R. Z. VIRGIN.

Unit vs. Departmental Control

Letter No. 7—I give my vote in favor of departmental control in all large coal-mining operations. In the underground workings of a mine the employees are very much scattered, which leaves them free to follow their own methods and practices. The territory is too large to be supervised by a single mine official.

Every mine of any importance should be divided into districts where about 30 miners would be under the supervision of one safety foreman who is competent to direct the work and see that it is performed in a safe and economical manner. A foreman in charge of, say 30 miners, will be able to visit each working place three or four times a day, and if he is a capable man the best results may be expected.

In addition to the thorough and constant supervision of miners at the working face, the mechanical and electrical equipment throughout the mine should be in charge of men capable of inspecting and directing the work in these departments. Also, the work of cutting the coal should be in charge of a competent machine boss. Likewise, there should be a driver boss to superintend all the drivers and motormen engaged in gathering the coal at the face and hauling it out of the mine.

The head of each department should keep the time of his men and hire and discharge them as he sees fit. Each department head should be held accountable for the cost of operation in his own district or department. It is my experience that better results are obtained where the men work under their own boss who is with them constantly and knows what work they perform. Mining, today, is not what it was 25 years ago, and the work requires more careful supervision and a wider knowledge on the part of the men in charge.

Shelburn, Ind. R. J. PICKETT.

Squeeze vs. Creep

Letter No. 2—It has never occurred to me that there was any difference between these two terms, which I have always regarded as having the same meaning and brought about by the same conditions in the mine.

My experience and observation have taught me that a squeeze, or "creep," as it is sometimes called, is the result of adopting an improper system of mining; or, it may result in the extraction of pillars when all the coal is not taken out but a few stumps are left back in the waste, which produces an uneven settlement of the roof and is liable to throw the weight forward on the pillars and cause trouble.

When mining a seam underlaid with a soft bottom, much care must be used or creep is sure to follow sooner or later. It is necessary to watch closely the line of fracture in the pillar workings. It may be necessary, at times, to bring men from other sections of the mine to rush work on the pillars where the places give evidence that a fall is due shortly.

I recall one instance where a creep started in the mine, owing to a large standing area where work had been abandoned. In order to stop the creep, I resorted to shooting stumps in the area, hoping thereby to start a roof fall. This did not have the desired effect, however, and I then resolved to break the roof by drilling 5-ft. holes upward in the strata, at different points. These holes were charged and fired one at a time, with the result that a heavy fall of roof occurred over a considerable area. For days after, I could hear the rock falling from the extreme side of the workings adjoining an already finished section. The sound was ominous.

Previous to that, in order to hold the roads open, it had been necessary to employ almost as many daymen lifting bottom and renewing timbers that were broken by the squeeze as there were men digging coal. This taught me a lesson that I have never forgotten. I take no chances now, but use every possible means to avoid the occurrence of squeeze or creep. These necessary precautions are: (1) Leaving sufficient pillar supports to protect entries and rooms while they are being driven. (2) Mining the coal clean when drawing back pillars. (3) Draining all roads and rooms of water.

West Leisenring, Penn. LUMEN.

Qualifying for Mine-Rescue Work

Letter No. 1—A short time ago, I remember reading an editorial in *Coal Age* [Oct. 13, p. 639], which described the method employed in the examination of candidates for mine-rescue work in Illinois. It seemed, from the outline given by the editor, that great care was taken to select those men who were best fitted for undergoing the arduous tasks demanded of mine rescuers and first-aid teams. In that connection, the following account of the manner in which four candidates who had passed the preliminary written examination in Illinois were further tested to ascertain their physical fitness will be of interest.

The four candidates were directed to appear at the mine-rescue station, at Springfield, Oct. 27, to undergo a physical examination by the medical examiner. Notwithstanding the fact that these men had been previously submitted to a strict physical test at the time they took the written examination, they were again subjected to a most rigid physical test that had particular reference to ascertaining the condition of the heart.

The purpose of this second test was to avoid the slightest possibility of any condition having developed since the first test was applied and to serve as a check on the previous work, the two tests being made by different physicians.

Following this test, each applicant was questioned by two men of long experience in mining and in rescue

work in Illinois. The candidates were first questioned in regard to first-aid matters and helmet work. The superintendent of the rescue station where the examination was held was made the object by which the men could demonstrate their methods of treating hypothetical conditions, which were suggested by the examiners. The men were asked to state the reason why a bandage was arranged or an arm lifted in a certain way.

This was followed by an examination to determine the candidate's knowledge of the construction and use of breathing apparatus. The men were made to put on the apparatus and enter a smoke room, where they were kept for an hour, performing the work of moving heavy articles and otherwise demonstrating their ability to do the work under difficult conditions.

As a result, all four men qualified, and the commission feels satisfied that it has four men on its list who have demonstrated their complete competence.

Springfield, Ill. FIRST-AIDER.

The Handling of Men

Letter No. 4—It is not my custom to write *incognito;* but, for fear that what I have to suggest in regard to the handling of men might seem like bragging, I am going to ask that my name be withheld this time.

The letters that have already appeared have interested me, particularly the statement of Joseph A. Greaves, *Coal Age*, Nov. 3, p. 777, that "to handle men successfully, it is necessary to cater somewhat to their likes and dislikes." I have found that the surest way to overcome a man's prejudice is to understand his particular disposition and humor him accordingly; in other words, get a line on the man that will give you the key to his make-up.

STUDY TO KNOW THE NATURE OF EACH MAN

Some men are susceptible to flattery, which produces wonderful results. With some men it is necessary to reason; while with others nothing but harsh treatment seems to have any effect in inducing them to comply with orders and regulations. Indeed, men who belong to this third class appear to think that their efforts are not appreciated if the foreman passes their place without some harsh enjoinder that, in some strange way, acts as a nerve tonic and animates them.

Many mine foremen seem to think that, at a time when men are scarce, it is best to allow them to do very much as they please. However, I generally find some way of bringing my men to a better understanding, by having recourse to a little tact or diplomacy. When a man's place is not timbered properly, and he continues to neglect instructions, I have found that the best way to bring him to time is to notify the motorman not to place any cars for him until he has complied with my instructions to timber his place.

It is not so much what a foreman says that counts as the manner in which he says it. A gentle but determined remonstrance will often produce results when continued nagging would avail nothing. Going into a man's place of a morning, I remark: "George, I see you have not set the posts as I ordered you to do yesterday. I shall expect to find this done the next time I come"; and, nine times out of ten, the man will leave what he is doing and set the timber at once.

The installation of a checking board, for checking the men in and out of the mine, is liable to prove a troublesome matter. Some foremen, after putting such a board in place and notifying the men to use it by putting their checks on the board when they enter the mine and taking them off the board when they come out, have been afraid to enforce the regulation for fear some of the men would quit. As a result, the board is of little or no use, as one-half the men will not bother with it unless forced to comply with the regulations of the mine.

TEACHING MEN TO REMEMBER THEIR DUTIES

When that ruling went into effect in this district, I had a board placed at the mine entrance and gave each miner a check with his number, telling them how it was to be used and stating that I would give each man one week to become acquainted with the new system. At the end of that time I told them that I would accept no excuse for a man's forgetting to hang up his check or to take it down when quitting.

After the first week there were but few men who forgot to comply with this regulation. Not finding their checks on the board in the morning, and knowing that they were in their places, I sent for them to come to the office at once. Taking them to the board, I told them that the motorman would place no cars in men's places whose checks were not on the board. This settled the matter of hanging the checks in their proper places when the men went into the mine.

But, it happened, occasionally, that men would forget to remove their checks from the board when coming out of the mine. This required a different form of treatment. My remedy, in that case, was to inform the men that a man would be sent into the mine to look for those men whose checks remained on the board after a certain time; and if it was found that a man had gone home without taking his check with him, the expense of looking him up would be charged to him and taken from his pay envelope. This proved an effective means of reminding men to take their checks with them when going home.

The cleaning up of a wet and sloppy slide was one job that required some diplomacy. To accomplish it, I started six men to work in a place near-by that was of no particular importance. Two hours after I came to them and told them that it would be well for them to clean up the slide first, so that the water would not back into the place where they were working, which was dry. The men saw the point at once, and there was no difficulty in getting them to do the work, which they would have refused to do had I started them to do that work the first thing in the morning.

There is one thing that all foremen should strive to do, and that is to make the work of their men as easy as possible. If a switch or piece of track is in bad shape, giving the motorman trouble, have it put right at once. Where men can be relieved of pushing cars by the simple extending of a wire, do not fail to have it done. Keep the water out of all working places as far as possible. Plan to drive rooms on a convenient grade, wherever this is practicable. Provide 12-lb. rails and steel ties, so that miners can lay their own tracks in their rooms in a few minutes each day.

———, Penn. MINE FOREMAN.

Inquiries of General Interest

Examination of a Mine

Kindly explain the manner in which a fireboss should proceed in the examination of a mine in the morning.

———, Ky. FIREBOSS.

The examination of the underground workings of a mine should begin at the shaft bottom on the intake air-course and should proceed with the air current. All entries, haulage roads, air-courses and manways or travelingways should be carefully examined to see that they are safe and properly timbered and contain no obstructions that would impede the flow of air through them. Each working place should be carefully examined, in turn, to ascertain that it is free from gas and ready for work and that the needed supplies of props, cap-pieces, and other needed material are on hand. The quantity of air passing in each airway and at the face of each room and in the last crosscut on each pair of entries should be measured. Care should be taken to see that the mine is operated in compliance with the requirements of the mining law and the regulations of the mine. After completing the examination, a proper report should be made and recorded in a book kept for that purpose.

Brake-Horsepower and Belt-Pull of an Engine

We are contemplating installing two second-hand engines at our mine. The first engine, which I will call No. 1, is intended to drive a mine ventilating fan guaranteed to meet certain required conditions when supplied with 80 b.hp., while the second, No. 2, is to operate an estimated load of 113 b.hp. According to my calculations, these engines are not capable of the work they are intended to perform.

No. 1 engine is 18 x 24 in. and designed to run at a speed of 77 r.p.m., with a mean effective pressure of 62 lb. per sq.in. This engine has a pulley 9 ft. in diameter. According to my figures, the area of the cylinder is $0.7854 \times 18^2 = 254+$ sq.in.; its length of stroke, 2 ft., and the number of strokes, $2 \times 77 = 154$ per min. Its indicated horsepower is then

$$I.H.P. = \frac{plan}{33{,}000} = \frac{62 \times 2 \times 254 \times 154}{33{,}000} = say\ 147\ hp$$

Assuming an efficiency of 80 per cent., the brake-horsepower of this engine is $147 \times 0.80 = 117.6$ b.hp. Since the ratio of the diameter of the pulley to the stroke of the engine is 9: 2, or 4.5: 1, I estimate the belt-pull as being $117.6 \div 4.5 = 26.13$, which is evidently very low.

Again, No. 2 engine is 15 x 20 in. and designed to run at a speed of 180 r.p.m., under a mean effective pressure of 62 lb. per sq.in. This engine has a pulley 8 ft. in diameter. For this engine the area of the cylinder is $0.7854 \times 15^2 =$ say 176 sq.in., the length of stroke, $20 \div 12 = 1.66$ ft., and the number of strokes, $2 \times 180 = 360$ per min. This gives, for the indicated horsepower,

$$I.H.P. = \frac{62 \times 1.66 \times 176 \times 360}{33{,}000} = 197.6\ hp.$$

Assuming the same efficiency as before, the brake-horsepower, here, is $197.6 \times 0.80 = 158$ b.hp. The ratio of the diameter of the pulley to the length of stroke, for this engine, is $8 : 1\frac{3}{5}$ or 4.8: 1, which would make the belt-pull, as I estimate it, $158 \div 4.8 =$ say 33 lb., which is, again, very low.

No. 1 engine can be made to meet the required conditions by using a 4-ft. pulley and running the engine at a speed of 155 r.p.m.; but this would be rather doubtful practice for that engine. On the other hand, No. 2 engine would seem to require either a higher steam pressure or a longer cutoff. The first of these requirements is not obtainable, and the second would be poor practice. If I am wrong in my assumptions, kindly set me right by showing me where my error lies. ENGINEER.

Black Diamond, Wash.

Our correspondent has calculated correctly the indicated horsepower of the two engines mentioned and, assuming an efficiency of 80 per cent., he has found the correct brake-horsepower, which is 117.6 hp. for the first engine and 158 hp. for the second engine.

The error lies, however, in estimating the belt-pull, for each of these engines, by dividing the brake-horsepower by the ratio of pulley to stroke. In order to calculate the belt-pull corresponding to a given brake-horsepower, it is necessary to reduce the latter to foot-pounds per minute, by multiplying by 33,000, and divide that result by the lineal velocity of the pulley, which is equal to its circumference multiplied by its speed expressed in revolutions per minute.

For example, since the brake-horsepower of the first engine is 117.6, the corresponding belt-pull for a 9-ft. pulley running at a speed of 77 r.p.m. is,

$$\text{No. 1 engine,}\quad Belt\text{-}pull = \frac{33{,}000 \times 117.6}{3.1416 \times 9 \times 77} = 1782\ lb.$$

In like manner, since the brake-horsepower of the second engine is 158, the corresponding belt-pull for an 8-ft. pulley running at a speed of 180 r.p.m. is,

$$\text{No. 2 engine,}\quad Belt\text{-}pull = \frac{33{,}000 \times 158}{3.1416 \times 8 \times 180} = 1152\ lb.$$

Since the first engine is required to drive a mine fan guaranteed to give the desired results when supplied with 80 b.hp., and No. 1 engine is estimated to develop 117.6 b.hp., there is little question but that it will be capable of performing this work.

Likewise, the work required of No. 2 engine is estimated as equal to 113 b.hp., while the calculation shows that this engine will deliver 158 b.hp., under the assumed conditions, and will perform the work required.

Examination Questions

First Examinations under the New Law, Pittsburg, Kan., Nov. 10, 1917

(Selected Questions)

Ques.—What one cause produces the most accidents in mines, and what steps would you take to prevent or reduce accidents?

Ans.—The largest number of accidents occurring in mines are caused by falls of roof and coal. To reduce the number of accidents from this cause, frequent and careful inspection should be made of the roof and coal face in all working places. In many instances the safest plan is to adopt a systematic form of timbering. In general, mine accidents must be prevented by maintaining discipline. Make and enforce suitable rules and regulations for the safe operation of the mine, and compel strict compliance with the mining laws of the state. All violations of the mining laws or mine regulations should be suitably punished.

Ques.—Name three instruments necessary for you to perform the duties of mine inspector. When, where and how are they used?

Ans.—The three instruments required by a mine inspector, in the performance of his duties, are: The anemometer, hygrometer and water gage. All of these instruments are used by the inspector when making his examination of a mine.

The anemometer is exposed to the air current passing a given point in the airway. It is held at right angles to the direction of the current and is moved about so as to obtain an average reading for the entire sectional area of the airway. The observation is continued for 1 or 2 min., as timed by the watch. Starting from zero, the reading of the anemometer, divided by the number of minutes it is exposed, gives the velocity of the air current in feet per minute; and this multiplied by the sectional area of the airway, in square feet, gives the quantity of air passing, in cubic feet per minute. Measurements of the air should be taken by the inspector, at the bottom of the downcast shaft, or the mouth of the intake airway; at the mouth and in the last crosscut of each pair of headings forming a separate split of air; also, in the last breakthrough of long rooms where the quantity of air is deficient.

The hygrometer is used to determine the percentage of moisture in the mine air by observing the reading of the dry and wet bulbs of the instrument. The percentage of moisture present in the air is calculated from these readings by means of a formula, or taken from a table designed for that purpose. Hygrometric readings should be taken by the inspector at different points of the mine, especially where the workings are dry and dusty.

The water gage is used to determine the difference of pressure between the intake and return airways, at the bottom of the shaft or slope, or at the mouth of separate air splits in the mine. Each inch of water-gage reading indicates a difference of pressure of 5.2 lb. per square foot.

Ques.—Explain the principles governing the flow of air in mines.

Ans.—Air, like other fluids, moves from a point of higher pressure to a point of lower pressure. The difference of these two pressures is the ventilating pressure producing the current. This ventilating pressure must be sufficient to overcome the resistance of the mine, which varies with the extent of the rubbing surface, the velocity of the flowing air and the coefficient of friction. Every mine or airway has a certain resisting power, which is determined by the relation of its rubbing surface to its area of passage, and this resisting power determines the quantity of air the mine or airway will pass, under a given power applied.

Ques.—When do you consider the quantity of air entering the downcast shaft sufficient for the ventilation of the workings?

Ans.—The quantity of air passing into a mine must not only be sufficient to comply with the requirements of the mining law, but also to properly ventilate all the working places in the mine. The proper ventilation of the mine can only be determined by a careful inspection of the working places, assuming that the air current is properly conducted forward and made to sweep the working faces, in the different headings and rooms.

Ques.—What kind of safety catches would you prefer, and why?

Ans.—The safety catches on a cage should be actuated by a suitable spring, in preference to weights, since the latter are rendered partially ineffective when a cage is falling in the shaft, while a good spring is always effective.

Ques.—If 35,000 cu.ft. of air per minute passes through an airway 7 ft. 6 in. wide, and 5 ft. 6 in. high, what is the velocity of the air?

Ans.—The sectional area of this airway is $7.5 \times 5.5 = 41.25$ sq.ft. The velocity of the air current is found by dividing the quantity of air in circulation by the sectional area of the airway. Thus, the velocity of the air, in this case, is $35{,}000 \div 41.25 = 848 +$ ft. per minute.

Ques.—Two airways have equal areas of 64 sq.ft. and are of the same length, 2000 ft. One airway is square, the other is 4 x 16 ft. in section. What is the rubbing surface of each airway?

Ans.—Each side of the square airway is $\sqrt{64} = 8$ ft. long; and the perimeter of this airway is, therefore, $4 \times 8 = 32$ ft. The given length of the airway multiplied by this perimeter gives the rubbing surface, which is $2000 \times 32 = 64{,}000$ square feet.

The perimeter of the rectangular airway is $2(4 + 16) = 40$ ft., and its rubbing surface is, therefore, $2000 \times 40 = 80{,}000$ square feet.

Coal and Coke News

For the Busy Reader

Development of further new coal properties during the war will be discouraged on the grounds that old mines can be operated more efficiently.

* * *

Production of bituminous coal for the first ten months of 1917 aggregates 454,326,059 tons. This is 9.9 per cent. greater than the production of the corresponding period of 1916.

* * *

Lignite slack produced in the Northern Field and El Paso districts of Colorado may now be sold at $1.25 per ton. An order increasing by 25c. the President's price was issued last week by Dr. Garfield.

* * *

"Reasonable" pooling of coal is recommended by the Railroads' War Board in its general plan for the operation of all the Eastern roads as a unit. Plans for handling the coal have not materialized. Dr. Garfield, the Fuel Administrator, J. D. A. Morrow, secretary of the National Coal Association, and others, are being consulted.

* * *

According to the report of the Department of Mines for the month of October, 13 of the 23 fatalities occurring in or near the mines of the state were caused from falls of coal or slate. Of the others, three were caused by mine car accidents; two to electricity; one to an accident in the mine shaft; three were due to accidents outside the mines, one at a tipple, two under cars.

* * *

In a single community in the Winding Gulf region of West Virginia 160 war gardens were planted and cultivated last summer in which more than 1000 bu. of potatoes, 640 dozen ears of corn, besides about 50 bu. which ripened for feed and seed, 12,000 heads of cabbage, 130 bu. of tomatoes, 50 bu. of onions, 225 bu. of green beans, 60 bu. of dry beans and 50 bu. of turnips were raised.

* * *

Following its policy of insuring adequate fuel to railroads that they may not have to resort to the commandeering of coal, the Fuel Administration last week issued orders directing mines under contract with the New York, New Haven & Hartford and the Central New England R.R. to give preference to their contract requirements. Similar orders will follow whenever necessary, but it is believed that they will be confined largely to Eastern roads.

* * *

Newly opened coal mines have been placed under direct Government control by the Fuel Administrator, who has issued regulations governing their operation and fixed prices at which their output may be sold. Operations classed as newly opened mines are those opened before Sept. 1 and ready to produce coal by Jan. 1, 1918. After the mines are producing at the rate of 250 tons a day they will be permitted to charge a profit of 15c. a ton above the actual cost of production. Until then they may charge only the Government prices.

HARRISBURG, PENN.

The state commission to study old-age pension systems and make a report to the next legislature organized at the Executive Department in the Capitol on Nov. 24, by electing James H. Maurer as chairman. Governor Brumbaugh addressed the commission, outlining his idea of drafting a law for this state.

Enough natural gas goes to waste every day in the anthracite region of this state to put a ring of fire around the German Empire. In the entire hard-coal field 72,000,000 cu.ft. of natural gas escapes every hour, representing 144,000 hp. lost every 24 hours.

These facts, Governor Brumbaugh told a conference of representatives of boards of trades and chambers of commerce from the anthracite region here on Nov. 23, were so important that he was of the opinion that the time had come to do something. "Of course," the Governor said, "the easy way out of the matter was to say that the escaping gas seeped away through innumerable openings from the mines, that no one had ever devised a plan for collecting it and that the thing could not be done. My answer to that," said Governor Brumbaugh, "is that when it is finally settled that a thing is impossible, watch some fellow do it."

The Governor did not present any plan for capturing this escaping gas, but suggested that the anthracite people get together in the matter, form an organization and offer a prize of $10,000 to $50,000 to the man who devises a method of utilizing the energy now going to waste in the anthracite region.

The Superior Court on Nov. 19 handed down a decision which will interest many operators in both the hard- and soft-coal regions.

In Dagostino, vs. Rogers et al, from Fayette County, the defendants conducted a store in connection with their Elm Grove Coke Works, and the plaintiff, who keeps a store nearby, alleged the defendants interfered with his business by requiring employees to deal at their store. They were threatened with discharge if they bought from Diagostino. A finding of $180 in favor of the plaintiff was had below, but Judge Henderson held there was no testimony to support averment that the defendant coke company maliciously intended to injure the plaintiff or drive him out. They simply desired the patronage of their employees at their own store. There was no legal prohibition forbidding defendants from making a condition of employment that their employees should patronize the store provided by them. The record did not disclose any evidence of malice and no question of negligence arose. The case was based on the superintendent's efforts to induce employees to trade at the company store, but the court finds that the plaintiff failed to establish a case which would support a judgment.

The Pennsylvania R.R. announced on Nov. 20 that it had placed an embargo on freight originating on all lines east of Pittsburgh, as well as on freight originating on connecting lines destined for points on or by the way of the western Pennsylvania division.

The western Pennsylvania division embraces the main line and branches from Altoona to Pittsburgh. An unprecedented congestion exists in that part of the system, the company stated. The embargo will be lifted as soon as conditions warrant. Government freight and food are not embargoed Neither are coal for byproduct ovens, coke for blast furnaces and limestone and granite.

At a meeting of about 200 coal and coke operators and railroad officials in Uniontown on Nov. 19 an attempt to pool the coal from the Connellsville region failed. The large coal and coke concerns and the railroad officials favored pooling the Connellsville product, but they were met with such stiff opposition from the smaller and independent concerns that it was decided not to do any pooling until the Federal Government ordered such an action.

The independent operators, controlled mainly by the steel and iron interests in the Youngstown and Pittsburgh districts, objected to the pooling of the coal, claiming that if such action was taken they would be compelled to produce an inferior quality of coke. After the discussion of coal ended the railroad officials warned the operators against overloading cars, claiming that most of the cars shipped from the coal and coke regions were so overloaded that many of the cars broke down or were impaired in such a manner that a complete overhauling was necessitated.

Notice to insurance carriers in compensation cases to use care in appeals is given in a decision rendered in a coal-mining case in which a man while cutting weeds and vines at the mouth of a mine cave came in contact with poison ivy and lost the sight of an eye. The insurance carrier contended that it had no notice, and the Board says: "It is not clear from the record that the insurance carrier put itself in position to complain. The appeal is taken by it and not by the defendant, and there does not appear to be any power of attorney on file or anything to show its right to complain. Besides the mere fact that the defendant carrier may not have been notified by that bureau or that the defendant itself failed to advise the insurance carrier is not sufficient grounds to reverse the award and findings of the referee."

A ruling in regard to compensation agreements is made in Eugene J. Brady vs. Lehigh Valley Coal Co. in which it is set forth that the act "contemplates that the employee's compensation shall be based upon his wages at the time of the accident and that if an employee previous to his accident had been promoted or had been changed to a different form of labor at higher wages, that fact constituted a new contract and his compensation is to be based upon that rate for as long as he has been in the employ of the same employer at that particular occupation."

PENNSYLVANIA

Anthracite

Stockton—Drainage of the Stockton coal basin, a much mooted question with mining men of the Lehigh region, is to be attempted. A contract has been let for the boreholes that are designed to accomplish this result. The holes will drain water into the sump of No. 40 colliery of the Lehigh Valley Coal Co. Another hole 12 in. in diameter is to be sunk by the Drake Drilling Co. and will be used to drain the Stockton pillars.

Drifton—Under plans for a sectional tunnel 635 ft. in length, old sections of the No. 1 colliery will be opened up and the haulage between Buck Mountain and the Drifton No. 9 colliery made much easier. There is a large area in this mine that can be profitably robbed, and this will be started as soon as the tunnel has been completed. Development work of this nature is scarce at the present time, owing to the war conditions.

Wilkes-Barre — Officials of the Lehigh Valley Coal Co. will shortly comply with the new state law requiring that a motor ambulance be maintained at mines outside of the 4-mile radius from the hospital. The machines have been ordered by the company and will shortly be placed in service.

Sunbury—In lieu of paving road taxes for the next year, the Philadelphia and Reading Coal and Iron Co., owner of large tracts of coal lands in Zerbe Township, Northumberland County, has agreed to do all the repairing and building of roads and bridges during that period. It will also pay the salaries of three road supervisors for the year, together with those of the township secretary and solicitor for the supervisors.

Wilkes-Barre—As has been their practice during the last several years, the coal companies will work out their taxes in Pittston, Jenkins, Hanover, Foster and Hazle townships, by improving the highways. The court has renewed the appointment of the road contractors in those townships. Pittston township has 20 miles of road, and Jenkins township, 10 miles. The contract for both townships was given to W. A. Phillips, and he began work on Dec. 3.

Pond Creek—The East End Coal Co. is rushing work on its property in completing concrete work on bridges and structural foundations. The company is doing its utmost to start mining on this old coal property as soon as possible, to assist in increasing the nation's output of hard coal.

Shamokin—Coal companies here have issued a warning to employees that unless they desist in the sale of their coal orders to the public they will abolish the employees' rate, which is 85c. a ton lower than the standard rate. Many miners have obtained orders ostensibly to fill their coal bins, and have had them discounted in wholesale liquor stores and saloons. Detectives have established these facts.

Scranton—Those citizens of West Scranton who have been congratulating themselves because their houses were on high ground outside the cave zone recently received a shock when they learned that the Olyphant No. 1 bed was but from 5 to 30

ft. below them. Certainty took the place of conjecture when the men near the foot of the hill who were supposedly grading for a garage, went down a few feet and commenced to throw out coal from an 8-ft. bed. The Se-Rob Coal Co. will mine the coal by making use of a tunnel from the Oxford Colliery workings, thereby removing the surface nuisance of the operation, another objection raised by the residents of the neighborhood.

Mauch Chunk — The Lehigh Coal and Navigation Co. has unfurled a new service flag at the Navigation Building, containing a large star with the number "390" encircled, to indicate the number of its employees that have gone to the colors.

Pottsville—If the important coal corporations of this region do not voluntarily release coal tracts on which independents are operating when present leases expire, Dr. Garfield, Fuel Administrator, will be asked to compel the issuance of leases in order to keep up coal production. The Mount Hope Coal Co. has already asked the Fuel Administrator to intervene and prevent the closing of its works.

Port Clinton—The Blue Mountain dam of the Schuylkill Navigation and Canal Co. is being cleaned out, and from 170 to 185 tons of coal from the size of rice to nut are being reclaimed daily. The coal sells at $1.50 to $4 a ton. It is said that in the bed of this immense dam is at least a million tons of coal.

Beaver—Owing to the inability of the Beaver Valley Traction Co. to obtain coal, this concern faces a serious situation if the cars are to be kept running. It has been found necessary to curtail the service. Only one car shipped from the mines in November was delivered to the company's power houses at Junction Park and Ambridge. There are nearly a score of cars en route to the plants, but the fuel is tied up in the yards along the Cleveland & Pittsburgh Railroad.

Bituminous

Clearfield—Three wildcats tied up operations at the mines of the Abel Coal Co. last week and incidentally cut down the production 200 tons. The animals had been prowling about the mines for a week or more, and on Nov. 16 the heavy frost on the ground showed the miners that the cats had gone into the mine. There was no evidence of their having come out, and the miners assembled at the entrance and sent some of the men to get guns. On account of the unusual conditions existing in this mine, several days passed before the last cat was killed. No coal was mined while the men were hunting the cats.

WEST VIRGINIA

Fairmont—A deed from the Empire Coal and Coke Co. to the New England Fuel and Transportation Co., covering the coal on lands along the Monongahela River, near Rivesville, has been filed here, the consideration recited being $1,500,000. The holdings covered are those belonging to the estates of the late Stephen B. Elkins, Thomas B. Elkins, Henry G. Davis, R. C. Kearns and their associates, all deceased.

Wayne—Until but recently a nonproducing county, Wayne County is now forging ahead and will soon be one of the recognized coal-producing sections of the state. The East Lynn field is gradually expanding, several new operations having been opened there in recent months.

Bluefield—The United States Coal and Coke Co.'s big commissary store at Jeanette, near Annawalt, was totally destroyed by fire of incendiary origin recently. No estimate of the loss could be obtained, but it will reach into the thousands. Detectives are making an investigation of the fire.

N. Murakami, of Tokio, Japan, who is said to be a representative of the Japanese government, is in the city on business. Mr. Murakami was joined here recently by Col. L. E. Tierney, of Powhatan, and James E. Jones, of Bramwell. It is understood that Mr. Murakami is placing contracts for coal for the use of the Japanese government.

Worthington—The work of sinking the shaft by the Consolidation Coal Co., on the Sarah L. Smith farm near the lower end of Worthington was recently resumed after a suspension of several months. A tipple will be erected and a large area of coal will be taken out there instead of hauling it to the tipple at mine 63.

Charleston—With more than 20 new coal developments along the Coal & Coke R.R. between Charleston and Gassaway in the last six months, the Elk valley is rapidly becoming one of the really important coal-producing sections of the state. The Pittsburgh seam, one of the best coals being mined in the state, has been discovered in the hills along the Elk River, and this is said to account for the unusual recent development there.

TENNESSEE

Memphis — Several sticks of dynamite have been found in coal delivered to the power plant of the Memphis Consolidated Gas and Electric Co. They were without fulminating caps and are presumed to have been unexploded in the mines. Inspectors have been set to watch the elevator which carries the coal to the furnaces.

Nashville—Public-spirited men in small Tennessee towns are forming companies which will handle wood for fuel at cost. The superintendent of the state capitol has extinguished several thousand incandescent lights at night until after the war.

Knoxville—The City Commission contemplates opening a municipal wood yard. A proposal that the city purchase and operate a coal mine to provide coal for its own use and for citizens has been decided against, but the wood-yard project is favored. A 40-acre woodland owned by the city would be cut first and then cord wood purchased for fuel on the open market.

KENTUCKY

Frankfort—The Frankfort Elevator Coal Co. has begun construction of a series of storage bins into which the coal will be dumped when elevated from the river barges. The stock will be kept under cover and will be loaded by gravity chutes into the company's wagon.

Owensboro—Complaints to the effect that local operators were violating a state law by working more miners than ten in a mine without an airshaft, brought Assistant State Inspector Charles Wells to the city. After a conference with the owners of the mines in question it was given out that the situation had been cleared up.

Lexington—C. J. Norwood, Chief Inspector of Mines of Kentucky, has issued an order calling on all vendors and users of explosives to keep records of sales and uses of them and to make reports to his office.

Middlesboro—Fire, believed to have been of incendiary origin, destroyed the drum at the mine of the Climax Coal Co., with a loss of $2000. A reward of $500 has been offered for the arrest and conviction of the incendiaries, and other operators are taking precautions to prevent similar fires.

OHIO

Cambridge—A deal was completed recently in which the Akron Coal Co. came into possession of 1036 acres of valuable coal land in Richland township. The newly acquired tract lies southeast of Lore City, reaching to within a short distance of Senecaville, and joins to the company's New Goodyear property at Lore City, which is now being opened. The purchase price of the tract was about $30,000.

Youngstown—A card system for coal distribution has been worked out for this city and will be under the general direction of the coal committee of the Chamber of Commerce, of which W. P. Arms is chairman. The coal shortage here has become so serious that a distribution system is imperative. Steel mill operations are curtailed. Only one ton of coal will be given to a family at one time.

INDIANA

New Albany—County fuel administrators in counties of southern Indiana are advocating that householders as far as possible turn to wood for fuel.

Jeffersonville—The local branch of the American Car and Foundry Co. has ordered more than 100 cars of coal which will be sold at cost to its employees.

ILLINOIS

Sparta—The miners' train running between Sparta and the mine of the Illinois Fuel Co. was telescoped recently when a string of coal cars becoming loose on the mine incline about a mile away, collided with the miners' train. Several miners were seriously injured, suffering broken legs, and one or two may die.

Murphysboro—About 150 men of the 200 employed at mine No. 9 of the Big Muddy Coal and Iron Co. here purchased Liberty Bonds aggregating $9000. The payments are to be deducted from the miners' wages weekly.

Springfield—Evan John, Director of Mines and Mining, has started on a trip through the southern Illinois field in the interest of the state-wide first-aid tournament to be held in Springfield in April.

The State Mine Examining Board will hold meetings in December as follows: Benton, Dec. 4; Harrisburg, Dec. 5; West Frankfort, Dec. 6; Herrin, Dec. 7; Duquoin, Dec. 8; Belleville, Dec. 13; Collinsville, Dec. 14; Staunton, Dec. 17; Nokomis, Dec. 18; Springfield, Dec. 19; Danville, Dec. 20; Peoria, Dec. 21; Spring Valley, Dec. 22.

Thayer—Fire of mysterious origin destroyed the machine shop of the Thayer mine recently. The loss is $15,000. Neither the shaft nor the tipple was damaged. The flames were almost under control when the water was shut off to admit of another line of hose being connected. The blaze broke out anew and the shop was completely destroyed. Two years ago to the day, the tipple was destroyed by an unexplained fire. The present fire did not interfere with the operation of the mine.

MISSOURI

St. Charles—M. E. Wilson, assistant state geologist, has made an examination of the coal vein a short distance south of here, at the request of the Chamber of Commerce, and will make a report, including estimates of prospecting, cost of operation, actual figures on coal found by previous surveys by the department and other definite data. He says that there are indications of a high grade of coal. Mines were operated here about 35 years ago. They were abandoned when the development of other fields, where the coal could be mined more cheaply, brought competition that was too strong.

Clayton, Mo.—The St. Louis County Fuel Committee, of which Sam D. Hodgdon is chairman, voted at a meeting to refuse permits to dealers who fail to make daily reports and do not coöperate with the committee. Several charges of short weight were made. It was stated that no coal had been shipped into Manchester and Valley Park for a month. The retail dealers of the county organized by electing F. W. Autenrieth as chairman. N. F. Reister, J. A. Basewell, H. A. Kinstra and Robert Sargent will work with him in perfecting the organization.

Personals

Quinn W. Stewart, engineer for the Tennessee Coal, Iron and Railroad Co., at Edgewater, Ala., has gone to Red Mountain as chief engineer Ore Mines division of the company.

P. J. Brennan has resigned as general superintendent of the Consolidated Coal Co., at Jenkins, Ky., to accept a similar position with the Raleigh Coal and Coke Co., at Raleigh, W. Va.

D. B. Mikesell, formerly assistant secretary of the Franklin County Coal Operators' Association, has been elected vice president of the Mikesell Brothers Co., with offices at 176-178 North La Salle St., Chicago.

T. W. Lloyd, formerly engineer in the Land Department of the Tennessee Coal, Iron and Railroad Co., has accepted a position as superintendent of the Aldrich Mines of the Montevallo Mining Co., at Aldrich, Ala.

Joseph H. Brown, assistant manager of the New York City office of the Sullivan Machinery Co., of Chicago, Ill., has been appointed district sales manager at Chicago, to succeed William P. J. Dinsmoor, who has resigned to engage in business at Denver, Colorado.

W. F. Trenary, Jr., with headquarters at 419 Brown-Marx Building, Birmingham, Ala., now represents the Harrison Safety Boiler Works, of Philadelphia, manufacturers of the Cochrane Heaters and other steam appliances, succeeding W. R. Jennison, whose connection with that company has terminated.

Frank L. Estep, of Birmingham, Ala., chief engineer of the Tennessee Coal, Iron and Railroad Co., since July, 1912, has resigned to take a similar position with the Nova Scotia Steel and Coal Co., New Glasgow, Nova Scotia. Mr. Estep entered the employ of the Tennessee company as assistant to the chief engineer in March, 1910.

W. L. Shaeffer, who has been assistant to W. L. Hamilton in the advertising and specialty department of the National Tube Co., of Pittsburgh, Penn., has assumed the position of manager left vacant by Mr. Hamilton, who has taken up new duties with the Walworth Manufacturing Co., of Boston, Mass., as mentioned elsewhere in these columns.

John C. Crichton, formerly of the sales department of the Bethlehem Steel Co., at Bethlehem, Penn., is now a member of the office force of the Johnstown Coal and Coke Co., with offices in the Farmers' Trust and Mortgage Building, Johnstown, Penn. John Crichton is a brother of Andrew Crichton.

president of the concern, and of H. A. Chrichton, secretary and treasurer of the company.

Wallace T. Roberts, sales engineer for the Sullivan Machinery Co., of Chicago, Ill., in lower Michigan, northern Ohio and northern Indiana, has been appointed district manager at Denver, Colo. Mr. Roberts succeeds Capt. M. R. Blish, Ordnance Department, U. S. A., acting manager at Denver since last May. George W. Blackinton, manager at Denver up to May last, is Captain, commanding 3d Battalion, 353d Infantry, National Army, Camp Funston, Kansas.

Harry B. Meller, dean of the school of mines of the University of Pittsburgh, has been commissioned a captain in theh aviation section, Signal Officers' Reserve Corps. Dean Meller has served as head of the school of mines at the University of Pittsburgh since 1915. He graduated from the University of Pittsburgh in 1909, and in 1911 was made an assistant instructor and vice dean of the school of mines. Among other schools in which he followed special courses were the University of Pennsylvania and the Michigan College of Mines.

L. F. Hamilton, manager of the advertising and specialty department of the National Tube Co., of Pittsburgh, Penn., has left the company and is now identified with the Walworth Manufacturing Co., of Boston, Mass. The Walworth company purchased the Kewanee works of the National Tube Co. on Aug. 1, and Mr. Hamilton will take up approximately the same duties with the Walworth Co. as he performed with the Tube company, more particularly the training of specialty students, supervision of specialty and sales promotion work, etc.

Industrial News

Chattanooga, Tenn.—Modification of an original order which placed a margin of $1.75 on all grades of coal handled by local dealers has given the dealers a margin of $2 a ton on domestic sizes and $1.50 on mine-run.

Dayton, Ohio—If the proper coöperation of the fuel commission and the city commission can be obtained, workingmen of the city will finance a municipal coal yard, it was said, the Central Labor Union having taken the matter up at its last meeting.

Cincinnati, Ohio—The third large movement of coal by river on an artificial wave created by manipulation of Government dams on the Ohio, arrived at Cincinnati on Friday of last week, with about 40,000 tons of fuel, contained in 90 barges. All of the coal stopped at Cincinnati, but part of it will be reconsigned elsewhere.

Youngstown, Ohio—The coal shortage in the Mahoning Valley has become so acute that one of the principal iron and steel companies has notified the Fuel Administration that unless relief is afforded soon it will have to close its plant. The company is said to be working upon a number of Government and Allied orders for steel.

Uniontown, Penn.—Pending a decision of the United States Appellate Court in the bankruptcy estate of J. V. Thompson, banker and coal operator, the Federal court has issued an order restraining the sale of a part of the bankrupt's $60,000,000 worth of coal lands in Monongahela and Green townships, Greene County, Pennsylvania, which was fixed for Dec. 1.

Memphis, Tenn.—A reduction of about 9 per cent. in the retail price of domestic coal is included in the retail price schedule put in effect, as of Oct. 1, by the Fuel Administrator. Under the order it is provided that not more than two tons shall be sold to any householder and that all must make affidavit that they have less than two tons on hand before being permitted to purchase more.

Columbus, Ohio—Information given out here by Vice President Sheldon, of the Toledo & Ohio Central Ry., shows this road, together with the Kanawha & Michigan, handled 950,000 more tons of coal at the Toledo docks than the tonnage for the same period last year. All cars of all roads, he stated, had been ordered returned to the owning roads upon the withdrawal of the Lake priority ruling.

Birmingham, Ala.—Frank B. Fowlkes, chairman of the fuel administration board of Jefferson County, predicts a coal famine for Birmingham by Jan. 1 if there is not begun at once a coöperative effort to conserve the present available supply. The quantity that may now be purchased by one person has been limited to five tons, and it will probably be reduced to one ton by the first of the year.

Lexington, Ky.—The State Railroad Commission has set Dec. 6 as the date for a hearing here of the complaint against the Louisville & Nashville R.R. made by the Board of Commerce, which seeks reduced rates on coal. The railroad company has asked that the petition be withdrawn, stating that the company is working out a new system of rates and that they should be in effect by the middle of January.

Cleveland, Ohio—Pleas of not guilty on charges of obstructing interstate commerce in holding up and confiscating coal from a New York Central Ry. train on Nov. 1 and 2 were entered before Federal Judge Westenhaven by Mayor William J. Carmichael, of Willoughby; Prosecutor George C. Von Beseler and two deputy marshals of Lake County. Bail was fixed at $3000 and the hearing was continued to the week of Dec. 10.

Youngstown, Ohio—Coal cards, permitting each holder to purchase a fixed amount of coal, will be issued in Youngstown within a few days, it was announced after a survey of the small amount of fuel in the city had been made. The cards will be issued by the Coal Committee of the Youngstown Chamber of Commerce, which announced the shortage here had become so serious that a regulated distribution system is imperative.

Louisville, Ky.—Shipments of coal to Louisville, which have been negligible for the last two years, practically have ceased altogether, it is said. A few barges of Pittsburgh coal were scheduled to reach Louisville several days ago on the artificial rise recently started down the river by the manipulation of the dams, but the failure of the shipments to reach here leads to the belief that the shipments have been diverted to some other river town.

Toledo, Ohio—Loadings at the Toledo docks during the week ending Nov. 23 were quite active. The Hocking Valley docks handled 129,000 tons, as compared with 140,000 tons the previous week. The total handled by these docks since the opening of navigation is 4,529,621 tons. The Toledo & Ohio Central docks loaded 61,000 tons, as compared with 62,000 tons the previous week. The total handled since the opening of navigation is 2,227,761 tons.

Charleston, W. Va.—The Public Service Commission recently entered an order in the case of the application of the Winifrede Railway Co. to increase its rates for hauling coal from the Winifrede mines to Winifrede Junction. The commission allowed an increase of 50 per cent.—from 10c. to 15c. The application asked that the railroad be allowed to raise the rate to 25c. per ton, but the commission did not see fit to grant this increase, merely allowing the increase of 5c. per ton. The order is effective for a year, or until further order from the commission.

Cleveland, Ohio—Operators from Ohio, West Virginia, western Pennsylvania and Kentucky completed details for the pooling of all coal shipments, both domestic and steam, to the larger centers of population in Ohio and Michigan. An organization called "The Coal Shippers' Terminal Pool Association" was formed. Details of bookkeeping, checking and the giving of credits and debits for differences in weights and price are now being worked out. The pooling arrangement has received the hearty support of Federal Fuel Administrator Garfield and Ohio Fuel Administrator Johnson.

Cincinnati, Ohio—An officer of the Cincinnati Retail Coal Dealers' Association has called to the attention of the Hamilton County fuel administration committee the fact that losses of coal by theft from cars on tracks have reached a serious point. It is declared that thefts are so large that there is a thriving illicit trade in stolen coal, which his sold at $2 a ton in some cases. Small dealers, especially peddlers, are complaining of the business lost to them on this account, and operators, on the other hand, are asking action to prevent the losses which fall on them through shortage in weight at the consignee's end.

Columbus, Ohio—The city board of purchase is considering the plan of asking for bids on coal in the future f.o.b. mines instead of delivered at the various plants. The board, in ordering some coal recently for one of the city plants, discovered that over $1 a ton on the cost of the coal can be saved. The city heretofore always asked for bids on coal delivered, and as only retail dealers have the facilities for delivering, they have been the only bidders. By use of the city teams to haul the coal, and possible workhouse labor, a considerable saving can be made.

Columbus, Ohio—Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, has written a letter to Federal Fuel Administrator Garfield protesting against the practice of railroad companies confiscating domestic sizes and asking that an order be issued restricting coal confiscations on the part of railroads to steam sizes for the next 90 days at least. Mr. Nigh cites several cases where dealers, after spending time and money, had secured several cars of coal for their customers, only to have them confiscated by the carrier, thereby causing suffering and loss of money.

Dallas, Texas—Retail coal dealers in Dallas effected a voluntary reduction of 75c. a ton for McAlester lump coal, following a conference with Wiley Blair, state fuel administrator. The price was reduced from $11 to $10.25 a ton. The operators have been stamping on their invoices a notice that the prices quoted thereon were "subject to revision." This means that, if the Government allowed the increased price the miners would demand payment of invoices at the higher rate. The retailers agreed to cut the price 75c. per ton, in the hope that the operators will not be allowed to charge a higher rate than that on the invoices.

Urbana, Ill.—The mayors of Danville, Urbana and Champaign have granted the Illinois Traction System permission to move carloads of coal through the streets of those cities at other hours and in larger sized trains than those prescribed by the franchises held in the various communities named by the interurban company. Under the franchises only 18 cars of coal a day can be moved through Urbana and Champaign, but by eliminating the restrictions which allowed transportation of coal through the streets of those cities only between the hours of 11 p.m. and 5 a.m., the traction company is enabled to increase its coal-delivering capacity to 30 cars of coal to champaign and Urbana per day.

Birmingham, Ala.—The Ensley Southern Railroad Co. (Southern System) has made application to the Alabama Public Service Commission to withdraw its petition filed with that body some time ago seeking to be allowed to abandon the portion of its line west of the Warrior River on account of the Federal Government's order that its bridge across that stream be raised or a draw placed in same to allow boats to pass. It has been decided to comply with the order of the Government. This line touches a number of large coal mines in the Walker County field, the output of which reaches the river over its rails and is loaded on barges for New Orleans and Mobile, and there was strong opposition to the granting of the petition.

Louisville, Ky.—Margins to be charged by dealers over the cost of coal to them have been fixed for Louisville, at least for the present, by the Kentucky Fuel Administrator, Wylie B. Bryan. On domestic coal a margin of $1.80 is provided; on industrial coal a margin of $1.60 and on anthracite coal a margin of $1.90. Prices on all these coals, delivered in the yards, are to be 75c. less on the ton. These margins would make western Kentucky lump range around $5.47 and eastern Kentucky lump around $6.29. These margins, it was concluded by the administrator, would give the dealers a profit of 25c. Immediate objections were filed by the retailers, and the question is to be opened again for further consideration by the Fuel Administrator.

Dallas, Texas—An advance in the selling price of coal at the mines was granted to Texas operators by Wiley Blair, state fuel administrator, after a conference in Dallas between Mr. Blair and a number of operators of Texas. The new schedule agreed on at the conference was immediately put into operation at the mines at Thurber, Bridgeport, Newcastle and Strawn. The advance on mine-run coal at Thurber, Strawn and Newcastle is $1.40 a ton, coal in prepared sizes $1.90 a ton, and slack and screenings 30c. a ton. This brings the prices f.o.b. the mines as follows: Thurber, Strawn and Newcastle, mine-run, $4.05; prepared sizes, $4.85; slack and screenings, $2.70. For Bridgeport the prices are: Mine run, $4.80; prepared sizes, $5.50; slack and screenings, $2.70.

Columbus, Ohio—John C. Stubbs, former traffic manager of the Harriman lines, now a member of the transportation advisory committee of the Ohio fuel administration bureau, was asked by Governor Cox to make a survey of the Ohio transportation situation. This action was taken following a statement by Chief Inspector Dugan, of the Ohio Public Utilities Commission, that according to his records there is a daily average of 20,000 loaded coal cars in yards and on sidings throughout the state. Among cases of delay in getting coal from mines to the consumer reported to the Governor is that of a car which took 23 days to make the trip from the Rush Run mine to Cleveland and back again, a distance of 268 miles. Another case was that of a consignment of three cars of coal which required three weeks' time in shipment from Nelsonville to Columbus.

Market Department

GENERAL REVIEW

The principal feature of the week is the shortage of cars and transportation facilities in general. The movement of coal, as well as its production, while showing increases in certain localities, is in general unsatisfactory.

Anthracite — Shipment of anthracite to various consuming centers have increased somewhat during the past week. However, the cold weather so stimulated orders for this fuel that a serious shortage is feared at various eastern points. Dealers were in many instances unable to relieve the demand which resulted from the cold wave. It is hoped in many quarters that a priority order will be issued in favor of New England with the close of Lake navigation. The volume of coal which has been steadily flowing to the Lake ports during the past few months, if turned to New England, either all-rail or for transhipment by water, would doubtless do much to relieve the situation in that territory.

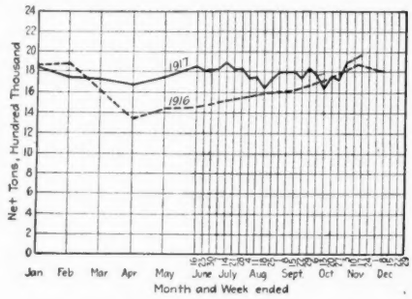
Bituminous—Adequacy or inadequacy of the country's fuel production now hinges upon transportation. Labor as a whole is at least temporarily quiescent. Much complaint is heard, however, of conditions, particularly in the Middle West, which do not permit the miners to work full time, and the wages actually earned are thus small. While it was earnestly hoped that the cessation of shipments to the Lakes would result in easier conditions of transportation, it now appears that the rolling stock employed in this traffic is now sent further afield, with the result that cars are slower in being returned to the mines. Lake shipments from the Pittsburgh region have now practically ceased, yet the car supply in this producing district is if anything poorer than before. This condition is more obvious perhaps in the coke industry than in coal production. The production of coke appears to be on the decline, not because fewer ovens are capable of operation, but because fewer cars are furnished and there is little incentive for coke stocking. The mild weather preceding the cold wave of the current week did much to relieve the critical situation in the Mississippi Valley, particularly west of that river. It is even said that certain consumers in Kansas City have been able to accumulate small stocks. The cold weather, however, brought a deluge of small orders from householders and other consumers; although many of these could be filled, a number could not be taken care of. Little is now heard of any unwillingness on the part of coal operators to sell at Government prices. In most cases operators would be glad to sell their coal, or that which is not taken up by contract, at the regulation price set by the Fuel Administration. This is, however, in most cases impossible because of the lack of transportation facilities. There is no scarcity of mines or of working places to produce the coal necessary, and while the scarcity of men is more or less pronounced and is often complained of by the operators the chief drawback, and the one which limits production at the present time, is the scarcity of cars. There appears to be no immediate prospect of relief from this condition. The real problem is thus rather one of distribution than of production. The substitution of one grade of coal for some other, which has been habitually burned in the past, may accomplish much toward relieving the present stringency; thus in Kansas City more run-of-mine coal is on hand in the dealers' yards and bins than current orders call for. There is, however, in this locality a pronounced shortage of lump. It is urged that consumers substitute run-of-mine coal for the lump which they have habitually burned heretofore.

Lake Trade—The Lake trade in general is approaching an apex. Shipments to the Upper Lakes are rapidly tapering off and some shippers have completed their season. Little anxiety is expressed but that the Northwest will be well taken care of so far as fuel is concerned. The movement to the Lakes by rail has practically ceased, and what coal is now moving is largely that which has been accumulated at Lake ports.

A Year Ago—Anthracite market quiet, but well maintained. Bituminous generally strong, but nervous and uneven. Cessation of Lake shipments fails to help the Pittsburgh district. Very urgent demand continues in the Middle West.

COAL PRODUCTION

Production of bituminous coal continued during the past week at a rate of 1,890,590 net tons per working day, an increase of 2 per cent. over the week of Nov. 10. If the present rate of production be maintained, November should prove the best month in the history of bituminous coal mining in the United States. The total production, including coal made into coke, is estimated as 11,343,538 net tons.



The total production of beehive coke is estimated as 625,651 net tons, an average per working day of 104,275 tons. Shipments of anthracite as reported by the nine principal carriers amounted to 42,199 cars. This is still below the level attained during October.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

District	Oct. 27	Nov. 3	Nov. 10	Nov. 17
Bituminous shipments, 114 roads	189,589	192,419	199,205*	203,054†
Anthracite shipments, 9 roads	42,338	21,314	40,459*	42,199†
Beehive coke shipments, 4 roads	12,900	12,234	11,799*	12,844†

* Revised from last report. † Subject to revision.

The October production of bituminous coal (including lignite and coal made into coke) is estimated to have been 47,429,780 net tons. Although the total output was larger in October than in the shorter working month of September, the rate of production declined from 1,773,659 net tons per working day in September, to 1,756,659 tons in October.

The month's production showed a gain over October, 1916. In that month the rate per working day was 1,723,354 tons, compared with 1,756,659 tons in October, 1917. The increase was effected in spite of the strike in Illinois during the week of Oct. 20, when the average daily production fell to 1,663,197 tons.

The total production from Jan. 1 to Oct. 31, 1917, is estimated as 454,326,059 net tons. This is an increase of 40,833,075 tons over the production in the corresponding months of 1916. The bituminous mines continue to produce more than last year, but the slowing down in the rate of increase over 1916, which began in September, also continues. Thus, by the end of September the 1917 production was 10.4 per cent. ahead of that in 1916; by the end of October it was only 9.9 per cent. ahead. It is apparent that only by acceleration of the present rate of production can the total output of the year 1917 exceed the record of last year by 10 per cent.

BUSINESS OPINIONS

Bradstreets—More cheerful feeling, probably born of the apparent successes of the allied arms oversea, heavy Governmental buying, the return of Liberty Loan money into circulation, 30c. cotton, unrestricted ordering by the excellently situated surplus crop zones, record high bank clearings, and superanimated activity in most industrial lines turning out essentials of war, are factors that easily eclipse any lagging tendencies that prevail. In a number of lines, and more especially in the East, buying for civilian account perforce reflects a pause, this being largely due to the fact that the Government's wants receive preference, and partly to the apparent inability of ordinary retail trade to enliven at a time when foodstuffs are inordinately high, when various campaigns to encourage economy are under way, and when, too, the ordinary man in the street is paying for Liberty Loan bonds in installments.

Dry Goods Economist — Business prospects throughout the country show a decided improvement as a result of the exchange of considerable quantities of crop money for other commodities. Perhaps the most noticeable effect of this exchange is found in the collections reported during the week. These collections, by the way, indicate also a satisfactory movement of fall goods.

The American Wool and Cotton Reporter—Buying in the Boston wool market has been largely on low- and medium-grade wools for use by the Government. Some of the low foreign wools are much more active, because the Government has altered its specifications for cloth. The market is healthy and firm. The cotton market fluctuates less than it did some time ago, but it still appears to be speculative. The figures in regard to domestic consumption were a surprise to many. It is contended that the transference of fancy-cloth machinery to the production of heavier staple fabrics will at least keep the consumption of cotton as large as it has been.

Marshall Field & Co.—The current wholesale distribution of dry goods for the week is not quite equal to the record period of a year ago. The total volume of road sales for both immediate and future deliveries has been holding its own with the corresponding week of 1916. Merchants have been in the market in fewer numbers. The market on domestic cotton goods is strong. Collections are excellent.

BOSTON

Trade in expectant attitude. Fuel administration Tidewater order looked to for some relief, but its significance to coal factors is mostly in action that may follow bearing on rail shipments. Slow loading still prevails at Hampton Roads. Trend is toward more and more restricting of smokeless coals to Government use. Unified control of coal roads expected to help movement from other fields. Sweeping changes likely next year. Anthracite still in arrears, and several localities make insistent demands.

Bituminous—With the approaching close of Lake navigation a great deal is heard here of possible action that will favor New England long enough to get coal that will soon be sadly needed. An increasing number of light and power companies, street railways, and other utilities besides a long list of manufacturing plants are getting near the danger line.

Colder weather has set in and during December there are sure to be many more emergency cases than have appeared thus far. The amount of free coal at rehandling plants accessible to inland trade is relatively meagre, and is being quickly absorbed. There is also less tonnage of smithing coal being offered, and as for free coal "let out" by the modification of "Rule 11," there seems available such small lots as to make this source almost negligible.

Surface indications are little changed from a week ago, but receipts have so consistently diminished that November figures are sure to be the smallest since April. While buyers as a rule are saying little for publication, there are many cases where alarm is justified. Most of the large bituminous operations in Pennsylvania and Maryland are required to ship so largely on Government requisitions and on priority movement that after railroad fuel is deducted there is only a small percentage, if any, left for contract obligations.

This being the case, and it having been demonstrated what a priority order can do for the Northwest, the trade here is now expectant that similar action can be made effective for New England. True, this territory cannot furnish return freight for open-top cars, but the situation is bound to be so serious that in one form or another increased shipments will have to be worked out.

The announcement of Nov. 22 that mines having contract obligations to ship to New

England via Atlantic loading ports would be notified to forward up to 100 per cent. on those contracts, was welcome news. While it is felt this will be extremely difficult to accomplish, because the tonnage such an order would cover moves largely via Hampton Roads, where the troubles are lack of trackage and motive power, yet the significant thing is the disposition at Washington to show concern for New England. The Tidewater order will help, undoubtedly, but the increased volume intended eventually for this territory will clash with that required for the Government for its urgent needs and for our Allies. Bunkering in mid-stream should help, and loading could be speeded up, but it is hard to see how the number of colliers for coastwise service can be increased for the present.

So much "No. 1" coal is already going for naval and other off-shore use that loading of these grades for New England, whether at Baltimore, Hampton Roads, Philadelphia, or New York is unlikely to show any great increase for some time to come. The effect will be more immediate on the lower grades particularly from Philadelphia and New York, but here again the lack of bottoms will be a factor. Today there is a surplus of boats over cargoes, but added receipts at the piers may be relied upon before long to set the balance the other way.

The real hope of coal men is in an all-rail order. The fuel authorities are not encouraging on this point, but from private sources there is a distinct opinion that a number of mines will soon be designated to ship in this direction after the Lake order has lapsed. There are operations with large capacity that have done splendid work for the Northwest, many of them with only small percentages sold on contract, and if cars could be furnished for this territory there would be some real relief. A good many emergency cases are reported that small shipments would relieve, as for instance, points along the coast of Maine.

Such needs could be met by sending cars to Philadelphia and New York piers and there dumping into vessels and barges. A large area of eastern territory could then be measurably taken care of. Places not directly on tide-water could be reached via rehandling stations at Portsmouth, Portland, Bath, Searsport, and Bucksport. In this way cars could be spared the long hauls that are now only too common.

Time alone will tell how these problems will be worked out. At this writing the plan of unified control of eastern railroads has just been given out. If equipment can be effectively pooled in the way outlined, there will doubtless be some substantial results in coal movement alone. The Virginia roads call particularly for this kind of remedy, since the terminal congestion at Hampton Roads grows more and more serious. When a steamer waits more than 3 weeks for cargo, as was the case recently, there is something radically wrong.

When 1917 contracts expire we are likely to see far-reaching changes in methods of distribution. Unmistakably the trend is toward the diversion of most of the "No. 1" coals to Government use, leaving other grades for other consumers. The point has been made recently that steam-users in Ohio, Indiana, and Illinois ought not to require such large tonnages of West Virginia and Pittsburgh grades when there is so much coal mined near at hand. This is another subject for the Fuel Administration to deal with.

The only quotations heard are on small lots from rehandling plants, now classified as "retailers" and even smaller and more scattering tonnages of free coal on the Government basis f.o.b. mines. Coal from rehandling plants is quoted at $9.25 f.o.b. Boston.

Anthracite—The fuel authorities are apparently giving much less attention to anthracite than formerly. There seems to be an impression in such quarters that somehow enough domestic sizes will come along to relieve the most urgent requirements. Dealers and shippers do not have great confidence in December and January shipments, which always are light on account of weather conditions. November was a poor month for water movement, and the arrears in tonnage are greater than ever.

Broken, egg and store are all in short supply, chestnut being difficult to secure. Some in the trade expect hard coal shipments to improve when Lake movement ceases, but car-supply is the critical feature. A few of the shippers who enlisted the coöperation of others to assist in deliveries for the Northwest are now being asked in return to help out consignments to New England. This help, however, is not sufficiently pronounced as yet to have any material effect on the situation.

Bangor, Me., is now getting its last shipments of the season, so far as water cargoes are concerned. Much has been done to give this port a preference on account of the ice embargo that usually is in effect by Dec. 10 to 15. Taking 1915 as a normal year, the receipts of domestic sizes at Bangor, Me., in 1917 will be about 60 per cent. This is a typical showing for a number of points along the coast.

All-rail deliveries are light, for the most part. Cars are taking much more time than usual to come through, and the percentage available for this territory is small, except on the railroads that are accustomed to handle practically all the hard coal for certain divisions of the territory. The Tidewater dealers who try to make good all-rail their shortages by water find the former route rather unsatisfactory to rely upon. Many of the shippers take the view that it would be unfair to all-rail customers who are short their normal requirements to attempt heavy shipments to dealers whose requirements are ordinarily met by water-borne coal.

NEW YORK

Shortage of anthracite serious. Cold weather increases demand and dealers are unable to relieve the situation. Some apartment houses receiving supplies on hand-to-mouth basis. The bituminous situation is tense, but may be relieved by the close of Lake season. No free coal here and industries are seriously threatened. Nothing has been heard from Washington regarding price revision.

Anthracite—Conditions in this market are anything but rosy. Coal is scarce as at any time during the past several years and some coal men say it has not been any worse in 20 years. Everybody is living in anticipation of better times in the near future.

The trade looks for some improvement when the Lake season ends, for while much of the tonnage sent westward will be diverted to relieve the New England situation, enough is expected to come to the New York market to ease local conditions. In the meantime the trade is careful in doling out its stocks, which are far from being sufficient to make a dent in the demand which has been greatly increased by the recent cold weather.

Many retail dealers are practically without coal and most of them have little or none of the domestic sizes, while some have more steam sizes than of the coals above Buckwheat No. 1. Some apartment houses are getting coal on a hand-to-mouth basis and as a result the tenants are complaining. In the poorer sections the suffering is more intense, cellar dealers finding it hard to get supplies.

A report of coal-cellar conditions made by city inspectors show that out of 119 cellar dealers visited in the first two weeks of November it was found that they delivered on an average of 21,372 lb. a week, the average cost of which was $8.88 a ton, and the average selling price $12.23. In December of last year it was reported that some dealers, owing to the scarcity of coal, were charging in some instances $25 a ton. A visit made by the same investigators in the third week of the month to 182 dealers shows that coal costing an average of $8.77 a ton was sold at an average price of $12.49 a ton. The report shows that the dealers claim their gross profit to be $3.61 a ton, or $0.181 per cwt.

Production is heavy but the demand is in keeping with it. The company product coming here is just sufficient to take care of regular orders with no surplus, while individual operators have their regular customers to look after. The mine regions are being thoroughly covered by representatives of local houses out after coal but they are meeting with little success. The output has been bought up for several weeks and it is difficult to close a contract for more than a few cars.

More companies have government contracts which must be taken care of before shipments are made to regular customers.

The trade was interested in the application made for increases in freight rates of from 25 to 50c. per gross ton from Perth Amboy, Cornwall and Weehawken for water shipments to New England points.

Conferences are frequently held between the local trade and fuel administrators looking toward the furnishing of coal to cellar dealers to relieve the situation in the poorer sections and these have been productive of much good. Arrangements are under way by which these dealers will be given supplies.

With the exception of barley the steam coals are about as scarce as the larger sizes. There is a heavy demand for all three of the small sizes, but barley is freer here due to the closing down of several mills where it is used in large quantities.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$5.95	$6.70
Egg	5.85	6.60
Stove	6.10	6.85
Chestnut	6.20	6.95
Pea	4.70	5.45
Buck	3.95@4.65	5.50@6.00
Rice	3.40@3.60	4.50@4.75
Barley	2.90@3.15	3.00@3.20
Boiler	3.15@3.40	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—There has been no noticeable change in the situation here. Coal continues to be scarce and buyers are having considerable difficulty in picking up stray lots. Conditions may show some change for the better when the government's order in relation to the manufacture of non-essentials goes into effect. This order ought to result in more coal coming into the market unless some of the plant owners succeed in getting government contracts which will entitle them to fuel shipments.

The situation here is little short of "desperate." Many plants have either their fires banked or are operating on a hand-to-mouth basis and the wonder is that more are not closed down entirely.

The pooling of the transportation resources of the railroads may go far toward relieving the situation. At present as for some time past production has been considerably curtailed by the lack of supplies and while there has been a shortage of labor the greatest drawback has been the scarcity of cars. With this condition remedied operators would be in a position to send more coal to the market and at the same time take better care of their contracts.

The closing of the Lake season is expected to result in more coal being sent here when the New England situation has been gotten in hand. The new order of the fuel administrator directing all mines under contract to supply New England customers by water carriers to deliver their maximum monthly requirements and which becomes effective today (Dec. 1) will not have much effect on local conditions but principally on the Southern shipping ports.

Nothing has yet been heard with regard to an increase in the price of coal for central Pennsylvania operators although it has been expected daily.

PHILADELPHIA

Anthracite shipments increase somewhat. Cold weather creates heavier demand. Card orders in effect. Government coal orders upset shippers. Prices fixed for bucket trade. Coal drivers restive. Bituminous situation critical. Car supply unchanged. Many mines on short time. Still hope for further price increases. Smithing coal active. Government after mine slackers.

Anthracite—Judged from the standpoint of increased receipts, particularly via the Pennsylvania R.R., there has been some improvement in the local retail situation. The railroads claimed an average daily delivery of more than 125 cars last week, with even better promised for this week, which they state is far in excess of normal deliveries. The most improvement has been to the West Philadelphia and Washington Ave. yards, and some dealers in the former district received as much as 125 tons a day. Yet with all this coal arriving it is far from being enough to fill the current demand and it will take many weeks of such shipments to make up for the shortage. The dealers have a dozen places wherein to place each ton received.

The demand was greatly stimulated by the arrival of the coldest weather of the season. Some of the retailers are refusing to take any additional business until they can reduce the accumulation of orders on hand. Furthermore, as there seems to be little doubt that the prices are to be advanced, none of them will quote rates, and orders are taken subject to price in effect when delivery can be made.

A number of local operators were called to Washington this week to go over the wage question with Mr. Garfield and it is understod that the individual operators made a vigorous defense of the differential in their favor being continued. They argue that the same causes still exist which influenced the Fuel Administrator to grant the original 75c. margin.

This week a new system of ordering coal from the retailer was put into effect. The Fuel Committee has furnished the dealers, through the Philadelphia Coal Exchange, with cards which the consumers will be compelled to fill out and sign when ordering coal. The buyer must give full answer to several questions as to his consumption of coal in the past and needs for the future, and he will practically make what amounts to an affidavit that he is not

hoarding coal. The dealers must keep the cards on file. This will be open to the inspection of the fuel committee for checking and the dealer will be held responsible for the proper distribution of his supplies.

The coal committee has also adopted a plan whereby cases of suffering can be relieved at once by the coal men. On a certificate signed by a physician that a home has an ill person in it the committee will issue a pink card which will insure delivery at once. These cards will only be issued at the office of the committee by presentation of the physician's certificate.

Retail dealers from eleven states met here the past week and organized the National Retail Coal Merchants' Association. A member of the association will be appointed to aid the National Fuel Administration and an office will be maintained in Washington. Because the coal shortage is national in scope the dealers purpose to cooperate with each other and endeavor to adopt methods to successfully solve the problem of equitable distribution.

The operators report they are receiving Government requisitions for coal at an alarming rate. As these orders are given preference, the plans of the shippers in apportioning their coal to the various markets are badly upset. This week the independents were called upon to furnish a large proportion of such business. Stove, which was already the shortest size, is being ordered in such quantities that it is sure to be extremely scarce all winter.

News of the cancellation of the priority order under which preference has been given to shipments to the Northwest, was received with much satisfaction and it is believed that the Eastern markets will soon notice further improvement.

The car situation continues to be much involved. The Lehigh Valley R.R. will not permit its cars to go to Pennsylvania R.R. points, while the B. & O. has once more placed an embargo on shipments reaching their lines via Park Junction.

As for some time past the demand for all sizes is so far beyond the receipts that it is useless to make a relative comparison of demand. Without exception the dealers beg for any size. Some of the largest yards have the least coal, probably because they have the most teams or trucks and can deliver their receipts more promptly.

Another unfavorable feature is that drivers of late, in numerous instances, have been bribed to make improper deliveries. Twenty-four such instances were heard of this week when several dealers began to check up with each other in the matter of errors in delivery. The driver invariably insists that an honest mistake has been made and takes the stand that the dealer loses nothing, as the cash is received for the coal.

Rules for controlling the bucket trade have now been formulated by the coal committee. Effective Dec. 15, the price of a 25-lb. bag of coal has been fixed at 16c. Storekeepers will be allowed to sell loose coal at the rate of 9c. for a quarter bushel of 18¾ lb., peddlers, 11c., and at the retail coal yards 10c. In order to see that the rules are properly enforced the city will coöperate by employing 35 inspectors to watch such sales.

The coal drivers in the Kensington section of the city have made a demand on the dealers there for a 20% increase in wages. The men are well organized and the dealers are endeavoring to arrive at some agreement with the officers of the union.

This week shows market sales of buckwheat, rice and barley at $4, $3 and $2, respectively. Prices for culm range all the way from $1 down to 55c. for the ordinary grade. This latter material is about the only coal the companies really have to offer and some of them refuse to handle it at all. The smaller shippers seem to have been making increased efforts to move it and we really believe that most sales of it are sample car lots and with the majority of users we feel the use of culm never gets beyond the trial stage.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.55	$5.70	Buck	$2.80	$3.40
Egg	4.45	5.75	Rice	2.30	3.30
Stove	4.70	6.00	Boiler	2.10	3.20
Nut	4.80	6.05	Barley	1.80	2.05
Pea	3.40	4.30			

Bituminous—Conditions are fast becoming critical on account of the continued insufficient car supply. There is no doubt that both the Government and the railroads realize the seriousness of the situation. Promises continue to be made by both that something will be done to relieve the stress, yet these promises are in no way different from those that have been offered for weeks past without result. The operators frankly state that between the low Government price and the lack of cars they are experiencing severe losses. The feeling now prevails that the situation has reached such a point that it cannot be any worse before improvement comes. Reports of plants closing down for more or less lengthy periods are becoming more frequent and this week one large iron manufacturing plant was closed for an entire day.

Shippers of smithing coal continue to take orders at the market price for their product, but most of these orders are taken subject to delays of from four to six weeks. All sorts of prices are quoted, sales recently ranging all the way from $4 to $5.80 per net ton. There is also considerable confusion in the minds of some purchasers of this coal as to their responsibility in buying this coal. Many steam users seem to be under the impression that it can be used for any purpose, whereas the general understanding is that it must be used for smithing exclusively.

The operators have not in the least ceased their efforts to secure a further increase in the mines price of their coal above the $2.45 figure set by the Government, although it cannot be said that much progress has been made. If anything, more sales have recently been made at the $2.15 price than have heretofore taken place, but even at that the tonnage has been of little consequence compared with the needs of the market.

The operators this week received a new report form to fill out for the Government. This is known as the "Slacker's Report," and the mine owners are directed to report thereon the names of indifferent workmen in their employ who labor but a small proportion of the time. Among the data asked is the age of each slacker, whether married or single and the record for each day of the week.

BALTIMORE

Soft coal situation slightly easier, but hard coal conditions are tense. New fuel administrator hardly down to work. Car supply poor.

Bituminous—Taken as a whole, there was a little better supply of soft coal noted here the past week. At present there is just a little surplus above the more pressing contract deliveries to allow of a small distribution of coal at Government prices. In this way the coal trade is keeping industries here moving, but no one has any fuel to spare, and many are begging for coal. This appeal includes many large corporations that are traveling too near the danger line of fuel supply for comfort.

The new fuel administrator, F. A. Meyer, is in operative control technically, but admits that he will need some time to grasp details of a business totally new to him, and on which there are scores of important war rulings by the national fuel administration. In the meantime he has been offered the aid of the various retail and wholesale coal associations and firms here, and there is a generally expressed desire for full coöperation from the trade. The administrator will spend some time in consultation in Washington before he really buckles down to work here. In the meantime he has taken the advice of some coal men on quasi-rulings that are temporarily needed as to coal distribution and sales here.

Car supply is very poor in many mining regions, and in parts of West Virginia and western Maryland, where cars were taken away by order of the Fuel Administration to be sent farther west, a few mines were forced to temporarily cease operations.

Anthracite—The hard coal situation remains truly tense. With cold weather here there remains many cellars entirely without fuel. To these are being given coal in small quantities as far as possible. Until some card system is fixed here by the fuel administrator the local coal men are relying on individual judgment and need in this distribution. The little coal to come through from the mines was rapidly wiped out. Prices, profit margins, etc., must remain unsettled until the local administrator acts in each case, but after all this is a small concern as compared with the present overshadowing fact that coal is not to be had at any price in most cases.

Lake Markets

PITTSBURGH

Lake shipments practically ended. Car supplies poorer. Curtailment in steel mill operations.

Shipments for the Lake coal trade have dropped to small proportions and notice has been given that the priority order as to car supplies for such shipment, in cases where not already withdrawn, will be annulled by Dec. 1. The total amount moved is regarded as entirely satisfactory, and the only complaint has been on the part of industrial consumers tributary to the Pittsburgh district to the effect that this district has been called upon to furnish an undue proportion of the total Lake coal required.

Car supplies for commercial loading have not improved, but on the contrary have grown poorer. The curtailment is to be ascribed partly to the fact that cars released from the Lake trade have gone farther afield and are slower in returning than is the case with the haul to and from Lake Erie ports, and partly to the fact that many railroad divisions have become badly congested, their yards and sidings being full of loaded cars.

Steel mills in the Youngstown district are operating substantially as poorly this week as in the past two weeks, when operations have been materially curtailed through shortage of coal. The Republic Iron & Steel Co. is operating its Bessemer department this week, after an idleness of more than a week, but operations in finishing departments are curtailed considerably, and nearly all other producers in the Youngstown district are operating at less than normal. There is less trouble in the immediate Pittsburgh district than in the Youngstown district.

Hardly anything is heard now of operators having production that they are unwilling to sell at the Government price. All now would be satisfied if they were able to operate and realize the Government price on coal not due upon contracts.

The turnover in the open market is extremely light. The market remains quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. permitted to be added in the case of sales by brokers.

BUFFALO

Great uneasiness in bituminous trade. Trying to establish a pool before the Government announces one. Cars very short. Anthracite more tranquil.

Bituminous—The local trade is perplexed at every turn. So many rumors are afloat about the moves made and to be made by the Government that nobody knows what to do. It is now said that the whole trade is to be pooled and that the jobbers will be driven out of business. As it is, most of them say that they are not making their office expenses and they see no prospect of improvement. The movement of coal is such that all the jobbers are going to Pittsburgh or perhaps Washington to see if they cannot get some sort of a supply or at least some assurance of improvement in the prospect. They mostly come home with no promises and are thoroughly discouraged. An effort to conform with the Government regulations has been made by the local coal association during the past week by getting into line for the pooling of all bituminous in some way, though the exact plan has not yet been worked out. It is expected that another organization will have to be made up from the present one in some way. The next move will probably be to ascertain what the Government wants in the carrying out of the work.

The situation is about as bad as it can be. Even if the handling of the coal by the trade is regulated, that does not provide any more cars, which have become so scarce of late that the trade would be fairly paralyzed if there were no other complications. It is hard to move coal anywhere and it is accumulating at junction points.

As the weeks go on there is more coal moving at Government prices, and if the car supply was sufficient the movement would be fairly good. The preference to the Lake trade is now thrown off and if more cars can be obtained there will soon be more coal for the uncontracted consumer. Prices per net ton, f.o.b. Buffalo, are as follows:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

The prices of smithing and cannel have not been regulated and they are selling all the way from $6 to $7.

Anthracite—There is no particular change in the situation. The sudden cold turn to the weather has increased the demand, but the county administrator has got the business better in hand and has about stopped the delivery of excess coal to anyone. It was this that made so many consumers short. The Lake trade cannot continue much longer and when it stops the Eastern trade ought to get plenty of coal.

Lake shipments of anthracite have continued large, being for the week to domestic ports only 144,200 net tons, of which 62,200 tons cleared for Duluth and Superior, 51,100 tons for Chicago, 27,900 tons for Milwaukee, 2400 tons for Ashland and 600 tons for Kenosha.

Freight rates are strong at $1.25 for Kenosha, $1 for Milwaukee, 85 cents for Chicago and 50 cents for Duluth and Ashland.

DETROIT

Efforts to increase supply of steam and domestic coal in Detroit are unsuccessful. Anthracite is promised. Some Lake shippers finish.

Bituminous—Attempts to get a larger amount of steam coal moving into Detroit are seemingly made in vain. Jobbers are meeting with disappointment in the effort to find coal that can be brought here. Demand from consumers continues strong. Reports that some of the industrial plants had accumulated excessive stocks appear to have been unjustified. A representative of the Federal coal administrator has been making an investigation but is said to have found no instances of hoarding coal among Detroit factories.

Enforcement of the conservation order against electric signs has resulted in materially darkening the down-town streets at night. Jobbers say no free coal is coming into Detroit and that many of the consumers of steam coal are working along on a day-to-day supply, continually facing the chance of having to close down.

Records of the Detroit coal administrator show more than 2000 families are without coal and that no coal is obtainable for them. The situation is serious, owing to the fact that winter temperature has replaced the long period of moderate weather. Efforts are being made to get wood to supply some of the homes without fuel. Hopes are still based on the expectation that coal shippers now sending stock up the Lakes will divert it to Detroit when the Lake season ends. So many other points are clamoring for coal, however, that the supply from this source may fall short of expectations.

Anthracite—Jobbers and retailers say the amount of anthracite arriving in the city is so small as to be scarcely worthy of consideration. Assurance is said to have been given by H. A. Garfield that an ample supply of anthracite will be arriving within a week or 10 days. Under his plan the coal is to be distributed through the usual channels and is to be shipped to retailers by operators from whom they bought last season. In a meeting of local coal men, Oct. 23, the charge was made that Detroit is being discriminated against in the matter of shipments.

Lake Trade—Some of the shippers of Lake coal have discontinued shipment from mines to loading docks and the entire movement is greatly diminished and probably will be practically completed by Dec. 1, when the Government is to withdraw the order giving Lake coal priority in car supply.

COLUMBUS

Colder weather has caused a rush of domestic orders and shortage in supplies appears at many points. Steam business is also active. Lake trade is progressing.

The feature of the coal trade in Ohio during the past week was the sudden cold weather, which brought a heavy demand for domestic coal. Dealers overwhelmed producers and jobbers with orders and shortage of stocks resulted. The policy of delivering only a small amount to each customer was followed more rigidly than formerly and the various local fuel committees had their hands full investigating cases of emergencies.

Steam business is also active and demand for tonnage comes from all sides. Public institutions have been supplied in emergencies and the same is true of power companies and service concerns. Government regulation machinery has frequently been called to the aid of a plant, where the fuel supply is exhausted. Investigation by the local committees is made to see if the demand comes from an essential industry. Railroads are taking considerable tonnage by the confiscation route.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$2.70	$3.05	
Inch and a quarter	2.70	3.05	$2.70
Three-quarter	2.70	3.05	2.70
Nut	2.70	3.05	2.70
Egg	2.70	3.05	
Mine-run	2.45	2.70	2.45
Nut, pea and slack	2.20	2.70	2.20
Coarse slack	2.20	2.70	2.20

CINCINNATI

Severe weather has added stimulus to domestic demand, and steam consumers are hard pressed for supplies. Deliveries are very uncertain.

The coldest weather of the season, so far, was experienced during the latter part of the week, snow falling all day Friday, while temperatures below freezing prevailed both on Friday and Saturday. The usual rush of small domestic orders followed, and the available supply of coal in the hands of dealers was virtually all taken at once, many consumers being unable to secure any fuel. Several dealers are not taking orders, as they have no coal on hand; and while supplies are reported to be en route, the amount of coal at present in the city is extremely small.

The larger steam consumers are not in a position to stand any prolonged failure of coal reaching them, either, and many are relying on day-to-day receipts to keep them going. As heretofore, the efforts of the trade and of authorities handling the coal situation are directed almost entirely to an equitable distribution of the coal on hand, and this has so far been successful, apparently, in avoiding suffering. With the probable early cessation of the movement to the Lakes, and with increasing receipts by both rail and river, it is hoped that the situation may be met without any real hardship anywhere, but this can be done only by great care and good fortune, it is admitted.

LOUISVILLE

Industrial demand continues at maximum; car supply fair, labor short and production still lagging. Cold weather brings domestic demand, with Government prices fixed.

Most of the recent developments in the Kentucky coal markets relate to the domestic field. The Fuel Administration authorities have fixed the retail prices in Louisville and in other places, allowing the retailer a margin of $1.80 on the ton, against which the dealers are protesting. There is an acute shortage of domestic coal in most places in Kentucky, some towns having none at all and temperatures below freezing to contend with. Efforts are being made to organize distribution to take care of such localities.

The wholesale trade is still unable to meet the demands for coal. Many consumers are offering orders for as much or as little coal as can be shipped at Government prices, leaving them to be filed. The production is not what would be liked and there is some complaint about the mine workers failing to respond efficiently to the demands for increased production. Help is short and advertisements calling for labor, skilled or unskilled, are being carried by some of the larger operators in the city dailies.

BIRMINGHAM

Domestic situation becomes acute locally and throughout the state. Cool weather cleans up stocks in many yards and fuel board is kept busy trying to replenish supply. Steam demand is none the less urgent than heretofore. Production handicapped much by car shortage at some points, and failure of miners to work full time.

The serious shortage of domestic coal has been emphasized more clearly this week than at any time heretofore. Local yards have been entirely cleaned up in a number of cases and have exhausted their resources to replace their stocks with but slight success. The local fuel board has been kept on the jump registering the complaints of the retailers and endeavoring to secure a supply to meet the strong demand of householders upon local dealers.

The difficulty in securing relief is not entirely chargeable to the mines, but in a great degree to the failure of the railroads to move coal after it has been loaded. The operators are showing a disposition to cooperate heartily with the fuel administrator in relieving acute conditions. The following prices are representative of the schedules arranged for the retailers by the fuel board: Montevallo lump and nut, $6.25 to $6.50; Cahaba, $5.60 to $5.90; Black Crook, $5.60 to $5.90; Carbon Hill and Corona, $5 to $5.50.

The steam trade is not susceptible of much change. The demand is as strong as it well can be in the spot market, while contract consumers are exacting maximum shipments, leaving a comparatively short supply to meet the open market demand.

The output at a number of mines suffered considerably the latter part of the week for lack of equipment, the normal supply of empties being curtailed considerably through loaded equipment being allowed to stand several days in some instances awaiting movement to consignee on account of inadequate motive power. It was then in transit twice or three times the usual length of time required for delivery. Miners still lack that high sense of patriotism which would impel them to labor regularly in producing the coal which is needed by the nation in this crisis, and are absenting themselves from work when it suits their convenience. The high rate of earnings now paid insures them ample provision for their needs in four to five days' work per week.

Coke

CONNELLSVILLE

Car supplies very poor and coke consumers losing much time. Winter weather feared.

Car supplies in the Connellsville region last week averaged about 50 per cent. of allotments, when 75 per cent. is required to meet the necessities of the blast furnaces depending on the region, and supplies until two or three weeks ago were averaging about 65 per cent. of allotments. Production of coke is correspondingly curtailed, as it is impracticable with most of the ovens to produce unless there are cars and operators who had stocked some coke have no incentive to continue to do so. The curtailment in production is quite evenly distributed among producers, whether merchant operators or producer-consumer operators. The Carnegie Steel Co. is operating only 48 of its 59 blast furnaces, by reason of inability to move more coke, although its facilities for following shipments are the best. Many furnacemen who buy their coke have men in the region and at intermediate points endeavoring to expedite the movement of their coke, spending a great deal of money to accomplish work that the railroads should do.

Temperatures have been hovering around the freezing point for several days past, but the weather is not believed to have had much effect upon movement. A severe snowstorm would be a calamity, and the hope is that there will be mild weather until January.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 17 at 306,240 tons, a decrease of 9568 tons, and shipments at 284,123 tons, a decrease of 18,645 tons.

Transactions in the open market are few and far between, there being scarcely any coke not already covered. Beehive coke is $6 for furnace, $7 for 72-hr. selected foundry and $7.30 for crushed, per net ton at ovens. Byproduct is $6, $7 and $6.50 respectively, plus coke freight from nearest competitive beehive district to the byproduct ovens.

Buffalo—The coke trade is practically invisible, so far as the jobber is concerned, as he has few contracts and is not able to get any single orders of account. So far no business in that way has been reported here, even by agents of oven companies. Still no complaint has been heard from the iron makers and it is supposable that they are getting all they want on their contracts.

Philadelphia—While the demand for coke continues to be strong, there is very little to be had. On such sales as are made the fixed prices of $6 for furnace, $7 for foundry and $7.35 for crushed coke are strictly adhered to.

Birmingham—District coke producers are kept busy trying to maintain a maximum output to take care of orders in hand and secure the equipment to move this in. There is little free coke available and this condition will obtain throughout the first quarter of 1918, therefore the recent government price schedule on by-product and bee-hive coke will not affect local interests materially for four or five months yet. The by-product prices announced a few days ago are: Run of ovens, $6; crushed, over one inch, $6.50, and selected foundry $7. There are approximately 850 byproduct ovens in the Alabama field, the output from which, like the beehive production, is sold up for several months to come. Box car equipment is scarce and the movement of coke is greatly handicapped on that account.

Middle Western

GENERAL REVIEW

Winter weather, with continued shortage of equipment producing panicky market in many localities.

Cold weather accompanied by snow hit the mid-West territory Thursday. With the advent of what appears to be the beginning of winter, dealers in all sections increased their already urgent demands on the producers for immediate shipment of any orders now on file, with requests they be booked for deferred shipments in addition to full current orders.

The car supply has not improved, and many mines report they have not received more than 60 per cent. car supply during the past week. Regardless of the fact the all-coal-carrying roads are putting forth every apparent available effort to relieve the situation, no noticeable relief is yet in sight. The real question is, what is the exact situation and how may it best be met? Producers, dealers, railroad officials and state and local fuel administrators are working in complete harmony with the national fuel administrator, taking advantage of any advice that would tend to promote better service.

At a conference held in Sheridan, Wyo., representatives of the miners and operators from the Northwestern coal-producing field in that state agreed to accept the Washing-

ton joint agreement carrying the automatic penalty clause. Exchange of telegrams between Doctor Garfield and the operators and miners of that district gave assurance of the latter's support to the Fuel Administrator during the continuation of the war. The penalty clause, which has caused so much discussion between the operators and miners, provides a penalty of $1 per miner per day to the operator for suspending work, likewise the same penalty to the miners for striking or suspending the operation of the mine.

Newspapers report that the miners in the Southwest after more than a week of committee discussion accepted Garfield's penalty clause. The agreement carries with it an advance of 10 to 39c. per ton, provided the miner remains loyal and takes advantage of the opportunities given him to work. Should the miners become rebellious and decline to work, like the miners in the Western territory, they are penalized.

CHICAGO

Many dealers supplied for week or ten days, others have little or no coal on hand

Taking as a whole the entire available domestic supply, it is estimated that 10 days' severe weather would deplete all the dealers' stocks, unless there is a substantial increase in the supply during that time. During the week just past, the movement of Indiana and Illinois coal into this market has in a measure given some relief. However, nothing like enough Eastern coal is reaching this market to relieve the demand. Radical measures are being taken by the Local Fuel committee to try and prevent any suffering, should we have severe or zero-like weather. It is claimed that there are large industrial storage stocks, that will be immediately drawn on, should the situation become more acute.

In order that all deserving dealers may get relief, Administrator for Illinois, J. E. Williams, has provided a blank for the purpose of advising his office through the coal-producing companies or jobbers and other coal distributors, of the exact situation, as to the coal supply in every community. The blank is so arranged that it can be checked easily and accurately, so that it will detect, if any misrepresentations are made, with reference to the inquiry. The blank is headed "Emergency Fuel Report," and reads in substance: "Where fuel is required to relieve actual or impeding distress, certain information is required before a request therefor can receive the attention of the coal-selling company or of the Fuel Administration. The validity of the claim for relief must, therefore, be investigated and certified by the local committee, in charge of the community affected. The following is the information required: Name of company. Address. On what railroad are sheds located? Present contracts, or previous company supplying you. The amount of coal on hand, and en route. Immediate needs, and monthly needs. Kind of and grade of coal you can use. Amount of coal received. From Apr. 1, 1917, to date and the amount to corresponding date of 1916. What other retail or industrial stocks in your city. By whom held and the amount. From what coal field and through what producing companies is your town normally supplied. Note: In case there is no local committee in your town, have the certification made by the Mayor or chief county officer."

When all the above data is furnished the Fuel Administrator, or the questions answered to his satisfaction, the order is sent to a producer or jobber to be filled. The filing of this blank properly filled compels the complainant to state facts, and prohibits the snow-bird, or the dealer with a bad record, from overdrawing the exact situation.

The labor trouble in Illinois and Indiana has largely disappeared. Admittedly there are at this time enough mines in operation to load all the cars that the railroads can provide, in fact the productive capacity of the mines exceed the rated capacity for car distribution at least 25%. There is still considerable trouble getting coal into Chicago from mines in southern Illinois located on the Missouri Pacific R.R. due to embargoes. However, th. amount of coal moving into this market via that line and its connections is so small that no noticeable effect will be made on this account.

Eastern Kentucky coal is very scarce here, little of this fuel reaching Chicago, and most of the time none at all. Little or no Hocking has come for several weeks, and there are but scant prospects for a supply from this source. Anthracite is not moving through in any great amount, although there are several dealers getting an increased supply.

Quotations in the Chicago market are as below, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, LaSalle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$2.65@2.80	$2.65@2.80	$2.65@2.80	$3.10@3.25
Domestic lump	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	3.10@3.25
Egg or furnace	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	3.10@3.25
Small egg or nut	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	3.10@3.25
Stove	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	3.10@3.25
Chestnut	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	2.65@2.80	3.10@3.25
Pea	2.65@2.80	2.65@2.80	.....	.....	2.65@2.80	.....
Washed egg	2.65@2.80	2.65@2.80	.....	.....	2.65@2.80	3.10@3.25
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.10@3.25
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.10@3.25
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55	2.40@2.55	2.40@2.55	2.85@3.00
Screenings	2.15@2.30	2.15@2.30	2.15@2.30	2.15@2.30	2.15@2.30	2.60@2.75
Washed slack	2.15@2.30	2.15@2.30	2.15@2.30	2.15@2.30	2.15@2.30	2.60@2.75

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky (Smokeless)	Pocah. and W. Va. (Smokeless)	Penna. (Smokeless)	Hocking (Smokeless)	West Va. Splint (Smokeless)
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Scarcity of cars hampering shipments to interior points. Local situation easier. Last shipments of anthracite being received.

Now that wintry weather has made its appearance, one hears less and less about coal or the possibilities of a fuel famine. This indicates that the great majority of the city people are well stocked up. Real below-zero weather might start something, however. In the country the situation is really serious and a shortage of railway cars adds to the gravity of the situation.

Four or five cargoes of hard coal have reached port within the past ten days and also a number of loads of bituminous. After next week no more hard coal will be allowed to come this way. Up to and including Friday, Nov. 23, 852,235 tons of hard coal and 2,834,028 tons of soft coal had been received. This represents a slight decrease in the shortage of soft coal as against last year's record.

No new price edicts have been promulgated and retailers are holding to the schedule which has prevailed for weeks. They are not satisfied, however, and are awaiting an answer to their petition for an increase in their margin of profit.

ST. LOUIS

Continued mild weather has brought about an easiness that is encouraging. Productive and transportation conditions are extremely bad, and car supply discouraging. Light shipments of anthracite and a little smokeless, with a small tonnage of Arkansas. Both steam and domestic demand light, however.

The situation still continues to improve on account of mild weather. If, however, seasonable weather prevailed, the situation would be critical, for the reason that transportation facilities have almost broken down on some roads. The terminal service also in and around St. Louis is extremely bad.

Car supply continues to become worse, and on account of several causes the production of coal decreases in some sections instead of increasing.

In the Standard field a great many mines worked but two days the past week, their tracks being blocked by loads that the railroad could not move for as much as three days at a time.

The local demand in St. Louis has been easy on account of the weather, and the yards are beginning to get a little coal ahead. The consumer also is being taken care of on his current needs, and some are getting coal ahead.

The steam consumer is in a somewhat similar condition. Screenings having been freer at times and again tightening up on account of the small production.

In the Missouri coal field the state fuel administrator has practically got assurance from the mines that if the railroads will furnish cars they will give him one day's output every week to be distributed as he may see fit to points in the logical territory for the different Missouri fields. This applies in particular to the mines around Lexington.

The state fuel administrator has accomplished much in the past week in supplying the country districts of Missouri with coal through notifying the railroads that they must furnish cars to mines both in Illinois and Missouri for this business. Coöperating with him is Attorney General McAlister. This action is bringing about much relief in the county sections.

In St. Louis the fuel administrator's work is progressing rapidly. All persons engaged in the handling of coal must apply for license.

A new classification of Illinois coals for the St. Louis market has been established as follows: Big Muddy field—Coal at Murphysboro and Harrison from the Nos. 1 and 2 veins; Carterville district is coal from Williamson ,Franklin and Saline Counties south of Eldorado on the Bg Four R.R.; Du Quoin district is all coal mined in Perry County from Sunfield south, including coal in Jackson County north of De Soto and in Saline County along the Louisville & Nashville R.R. and in Gallatin County; Mt. Olive district is coal mined in Macoupin, Montgomery, Chrstian and Madison Counties, including Maryville and Troy and north thereof; Standard district is coal mined in St. Clair, Clinton, Randolph and part of Perry County north of Du Quoin, and part of Madison County south of Maryville.

The retail price of coal has not been changed and is, per net ton gutter delivery; Carterville, $5.50; Mt. Olive, $5; Standard, $4.75; anthracite grate and egg, $9.75; stove and chestnut, $10; West Virginia smokeless, $9.75.

The prices per net ton f.o.b. mines are:

	Williamson and Franklin County	Mt. Oliv and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson and Franklin County rate is 87½ cents.

Other fields, 72½ cents.

KANSAS CITY

Campaign started to encourage the use of run of mine. More coal now on hand than orders call for. Maximum retail prices not yet fixed.

A campaign has been begun in Kansas City for the purpose of stimulating the purchase of mine-run coal in place of lump. This is being done through the newspapers at the request of the local fuel commission, which has discovered that, while there is a distinct shortage in lump coal, both soft and semi-anthracite, there is an oversupply of mine-run coal in both grades. As a result of the campaign there has been since Nov. 17 a large sale of mine-run coal reported, even in the better residence sections. It is cheaper and better for banking fires.

The report made by the commission on Nov. 17 showed that there were orders for 4400 tons of Cherokee lump and the visible supply was only 1400 tons. Orders for semi-anthracite totaled 6103 tons, and the visible supply was only 802 tons. Taking all varieties of mine-run coal there were 11,648 tons on hand and orders for only 4964 tons. The commission is taking inventory of the coal supply every two weeks.

The fuel commission is still endeavoring to reach a fair maximum price for retail coal in Kansas City. The commission has determined the figures on cost at mines, the transportation, etc., but will obtain the aid of the Federal Trade Commission in securing the overhead expense of the various coal dealers in the city before fixing the price.

Current Prices—Materials and Supplies

IRON AND STEEL

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Nov. 28, 1917	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$35.90	$33.00	$18.90
No. 2 Northern foundry	35.90	33.00	21.76
NEW YORK			
No. 2X Northern foundry	34.25	34.25	22.00
No. 2 plain Northern foundry	33.75	33.75	21.00
No. 2 Southern foundry	37.25	37.25	22.00
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	16.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	22.00
No. 2 Southern foundry	37.00	37.00	....
PITTSBURGH			
Bessemer iron*	36.30	36.30	24.95
Basic iron*	33.00	33.00	20.95

*These prices include the freight charge from the valley to the Pittsburgh district. †Delivered Tidewater, New York.

Note—On Sept. 24 the President approved the new schedule of steel prices, that of pig iron being set at $33.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York Nov. 28, 1917	New York 1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.195	$3.25	$4.27	$4.20
Channels 3 to 15 in.	3.00	4.195	3.25	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	3.25	4.27	4.20
Tees, 3 in. and larger	3.05	4.245	3.40	4.27	4.25
Plates	3.225	4.45	4.00	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	St. Louis	Denver	Birmingham
Nov. 28, 1917	4.00	4.45	3.45	4.50

NAILS—Prices per keg from warehouse in cities named:

	Mill, Pittsburgh	St. Louis	Denver	Chicago	San Francisco	Dallas
Wire	$2.70	$4.30	$4.38	$4.25	$4.60	$4.50
Cut	2.70	5.25	....	4.40	6.15	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Nov. 28, 1917	Pittsburgh 1 Year Ago	Chicago	St. Louis	San Francisco	Birmingham
Standard railroad spikes, ⅝-in. and larger	$5.00 to 7.00	$2.65	$5.00	$6.45	$7.25	$8.00
Track bolts	7.00 to 8.00	3.25	6.25	Premium	8.80	6.75
Standard section angle bars	3.50	2.00	4.50	Premium	4.65	...

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts held on Apr. 30, 1917:

Cleveland	Chicago	St. Louis	Denver	Birmingham
List	+10%	+10%	+35%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill, Pittsburgh	Chicago	St. Louis	Denver	Birmingham
Straight	$4.75	$7.00	$5.50	$7.50	$6.75
Assorted	4.90	7.00–7.50	5.75	7.75	7.00

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Nov. 28, 1917	New York 1 Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$59.50	$59.50	$34.50	$58.35	$57.00	$61.00	$57.00
6 in. and over	56.50	56.50	31.50	55.35	54.00	58.50	54.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per 100 lb. f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Nov. 28, 1917	Pittsburgh One Year Ago	Chicago Nov. 28, 1917	Chicago One Year Ago
Standard bessemer rails	$38.00	$33.00	$38.00	$33.00
Standard openhearth rails	40.00	35.00	40.00	35.00
Light rails, 8 to 10 lb.	83.00	50.00	83.00	43.00
Light rails, 12 to 14 lb.	82.00	49.00	82.00	42.00
Light rails, 25 to 45 lb.	75.00	47.00	75.00	40.00

Note—Rerolled rails as valuable as new.

OLD MATERIAL—Prices per net ton in Chicago and St. Louis (including delivery to buyer's works and freight transfer charges):

	Chicago Nov. 28, 1917	Chicago One Month Ago	St. Louis Nov. 28, 1917	St. Louis One Month Ago
No. 1 railroad wrought	$25.00	$28.50	$30.50	$29.00
Stove plate	16.50	15.50	16.50	10.00
No. 1 machinery cast	20.50	20.00	19.00	19.00
Machine shop turnings	16.50	15.00	16.75	14.00
Cast borings	16.50	14.25	16.50	12.00
Railroad malleable cast	26.00	24.00	25.50	24.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Chicago	Birmingham	St. Louis	Denver
$0.12	$0.09	$0.16	$0.15	$0.14

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Chicago
Solid	12c.	14½c.	9c.
Hollow	24c.	23½c.	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh, basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Steel Black	Steel Galvanized	Iron Inches	Iron Black	Iron Galvanized
¾, ¼ and ⅜	44%	17%	¾ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅝, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	32½%			
¾ to 1½	49%	36½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2¼ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

Note—National Tube Co. quotes on basing card dated Apr. 1.

From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
¾ to 3 in. butt welded	38%	42.8%	40.1%
3½ to 6 in. lap welded	18%	38.8%	36.1%

	Galvanized New York	Galvanized Chicago	Galvanized St. Louis
¾ to 3 in. butt welded	22%	27.8%	25.1%
3½ to 6 in. butt welded	List	24.8%	22.1%

Malleable fittings, Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York Nov. 28, 1917	New York One Year Ago	Cleveland Nov. 28, 1917	Cleveland One Year Ago	Chicago Nov. 28, 1917	Chicago One Year Ago
Hot pressed square	List	$0.50	$1.30	$3.00	$2.00	$3.00
Hot pressed hexagon	List	.50	1.20	3.00	2.00	3.00
Cold punched square	List	...	List	2.00	1.50	2.50
Cold punched hexagon	List	.50	List	2.75	1.50	3.00

Semifinished nuts sell at the following discounts from list price:

	Nov. 28, 1917	One Year Ago
New York	50%	50—10%
Cleveland	45%	65—10%
Chicago	50%	65—10%
St. Louis	50—10%	.....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
¾ by 4 in. and smaller	30%	35%	40—10%
Larger and longer up to 1 in. by 30 in.	15%	25%	30—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York ..... $1.00 Cleveland ..... $3.50 Chicago $3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York ..... $5.00 Cleveland ..... $5.50 Chicago $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	30%	40%*
Tinned	30%	30%	40%*

*For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in., sell as follows per 100 lb.:

New York ..... $7.00 Cleveland ..... $6.85 Chicago $5.50

Coneheads, same sizes:

New York ..... $7.10 Cleveland ..... $6.95 Chicago $5.60

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Chicago	St. Louis	Birmingham	Denver
Cup	5¼	5.6	10½	10½
Fiber or sponge	6	5.9	15	15
Transmission	6	5.9	13	13
Axle	4	3.3	4	4
Gear	4½	6	5½	5½
Car journal	3½	3.75	5	5

BABBITT METAL—Warehouse prices in cents per pound:

	New York Nov. 28, 1917	New York One Year Ago	Cleveland Nov. 28, 1917	Cleveland One Year Ago	Chicago Nov. 1, 1917	Chicago One Year Ago
Best grade	70.00	60.00	80.00	50.00	70.00	50.00
Commercial	40.00	30.00	21.50	17.00	25.00 to 30.00	18.00

HOSE—Following are prices of various classes of hose:

Fire	
	50-Ft. Lengths
Underwriters' 2½-in.	65c. per ft.
Common, 2½-in.	40–10%

Air			
	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade... 30% Second grade... 30-5% Third grade... 40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	40%
Denver	40%	40%
Birmingham	40%	40%
Chicago	30—10%	40—5%

RAWHIDE LACING—10% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.77
Asbestos for high-pressure steam	1.54
Duck and rubber for piston packing	.88
Flax, regular	.66
Flax, waterproofed	.99
Compressed asbestos sheet	.99
Wire insertion asbestos sheet	1.21
Rubber sheet ¼	.55
Rubber sheet, wire insertion	.88
Rubber sheet, duck insertion	.44
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York	St. Louis	Chicago	San Francisco
Galvanized	10—2½%	10—2½%	10—2½%	List
Bright	20—2½%	20—2½%	20—2½%	15%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is the price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.35½	Kansas City	$0.33½
New York	.34	Los Angeles	.33½
Chicago	.32½	Seattle	.33½
Denver	.35½	St. Louis	.33
Birmingham	.35½		

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard Thickness Per Lin.Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05

85% magnesia high pressure... 15% off

For low-pressure heating and return lines... 4-ply.... 58% off; 3-ply.... 60% off; 2-ply.... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Nov. 28, 1917	One Year Ago	Nov. 28, 1917	One Year Ago	Nov. 28, 1917	One Year Ago
Raw in barrels	$1.20	$1.01	$1.22	$1.05	$1.18	$0.96
5-gal. cans	1.30	1.11	1.35	1.15	1.28	1.06

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White			
	Nov. 28, 1917		1 Year Ago		Nov. 28, 1917		1 Yr. Ago	
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil		
100-lb. keg	12.25	12.50	10.50	11.00	12.00	10.50		
25- and 50-lb. kegs	12.50	12.75	10.75	11.25	12.25	10.75		
12½-lb. keg	12.75	13.00	11.00	11.50	12.50	11.00		
1- to 5-lb. cans	14.25	14.50	12.50	12.50	14.50	12.50		

CALCIUM CARBIDE—Price f.o.b. cars at warehouse points in Eastern States is $102.50 per ton for Union miners' lamp carbide, and $97.50 per ton for Cameo miners' lamp carbide. Union sells in 25-lb. cans for $1.46 per can.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$13.50	Birmingham (clay)	$8.00
St. Louis, salmon	8.00	Birmingham (shale)	9.00
Denver	8.00		

FUEL OIL—Price variable, depending upon stock. New York quotations not available owing to this fact. In Chicago and St. Louis the following prices are quoted:

	Chicago	St. Louis
Domestic light, 22-26 Baumé	5½c.	7½c.
Mexican heavy, 12-14 Baumé	7c.	none

OIL—Price per 50-gal. bbl. is as follows:

City	Fuel	Black	Red Engine	Steam Cylinder	Gasoline
Seattle	$4.45	$6.25	$11.00	$21.00	$10.25
Los Angeles	1.45	6.50	12.00	26.00	10.00
Denver	3.25	8.75	18.00	24.00	12.00
St. Paul	3.00	5.50	11.00	17.50	10.05
Boston	5.50	10.50	15.00	20.00	12.50
Kansas City	7.20	5.20	10.50	17.85	10.15

Note—Standard prices of oil are necessarily difficult to give. Those above are for average grades.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York and Chicago:

	1-Ply		2-Ply		3-Ply	
	c.l.	c.l.	c.l.	l.c.l.	c.l.	l.c.l.
No. 1 grade	$1.15	$1.40	$1.45	$1.60	$1.75	$1.90
No. 2 grade	1.10	1.25	1.25	1.40	1.50	1.65

Asbestos asphalt-saturated felt (14 lb. per square) costs $6.50 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.85 per roll in carload lots and $2.10 for smaller quantities.

Shingles, red and green slate finish, cost $4.75 per square in carloads, $5 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less Than Carload Lots
Tar felt (14 lb. per square of 100 sq.ft.)	$61.00	$62.00
Tar pitch (in 400-lb. bbl.)	15.00	16.50
Asphalt pitch (in barrels)	29.00	30.50
Asphalt felt	60.00	62.00

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Nov. 28, 1917	One Month Ago	One Year Ago
$4.50 to $5.00	$4.50 to $5.00	$2.60 to $2.70

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$79.00	$135.00
Chicago	79.00	119.00
Denver, per ton	110.00	200.00
Kansas City	58.00	112.00
St. Paul	55.00	138.00
Boston	95.00	171.00

LUMBER—Price of yellow pine per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft.	2-In. T. and G.	8 x 8 In. x 20 Ft.
St. Louis	$32.00	$29.00	$30.00
Birmingham	25.00	30.00	22.00

Price per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and G. 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y.P.	Fir
Kansas City	$41.00	$42.50	$41.00	$50.00	....
Seattle	21.00	21.00	21.00	21.00	$21.00
Los Angeles	....	30.00	30.00	....	....
Denver	....	30.00	30.00	....	30.00

	8 x 8-In. x 20 Ft. and Under				12 x 12-In., 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Kansas City	$41.00	$33.00	$33.00	....	$47.00	$33.00
Seattle	21.00	21.00	21.00	$21.00	21.00	21.00
Denver	....	32.00	....	28.50	....	34.00

Note—Boston lumber market demoralized.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$12.25	$15.20	$29.75	$13.50	$18.00	$30.00	$12.50	$17.90	$36.80
10	24.50	27.70	54.95	27.25	30.10	....	30.30	34.30	67.60
8	34.90	38.50	76.80	38.45	42.45	....	42.85	46.85	....
6	....	59.10	....	....	65.35	....	69.60	74.10	....
4	....	85.15	....	....	93.65	....	101.75	106.50	....
2	....	127.50	....	....	140.50	....	156.50	163.00	....
1	....	165.35	....	....	182.50	....	201.00	209.00	....
0	....	198.55	....	....	241.50	....	276.00	285.50	....
00	....	267.05	....	....	294.50	....	317.00	330.00	....
000	....	327.35	....	....	360.50	....	417.00	428.50	....
0000	....	399.60	....	....	439.50	....	508.00	516.00	....

EXPLOSIVES—Price per pound in 200-lb. lots at cities named:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder*
New York	.....	$0.27½	$0.34½	.....	$2.50
Boston	.....	.....	.36¼	$0.43¾	....
Kansas City	$0.20	.26¼	.33¼	.43¼	....
Los Angeles	.20	.27	.35	.....	....
Seattle	.18½	.24¾	.31¾	.41¾	....
Chicago	.19¾	.23¾	.33	.43	2.45
St. Paul	.20	.26¼	.33¼	.....	2.55
St. Louis	.16½	.20½	.29½	.39½	2.15
Denver	.19	.25¼	.32¼	.42¼	....
Dallas	.25	.29	.39	.49	....

*Keg.

FREIGHT RATES—On finished steel products in the Pittsburgh district, including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Pacific Coast (all rail)	90.0
Cleveland	13.5	Philadelphia	18.5
Denver	79.0	St. Louis	27.0
Kansas City	47.0	St. Paul	35.5